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Original Contributions.

COEDUCATION IN DENTAL COLLEGES, AND IS DENTISTRY A SUITABLE CALLING FOR WOMEN?

BY J. A. CHAPPLE, D.D.S., ATLANTA. READ BEFORE THE NATIONAL DENTAL ASSOCIATION, AT ASHEVILLE, N. C., JULY 28-31, 1903.

Reared in an atmosphere and among traditions that well nigh forbade the thought of woman ever becoming a bread-winner, or man's competitor in the race for honors, our environment was very naturally averse to the theme. But as landscapes are vastly dissimilar, our environments are no less so, and we therefore deem it appropriate, as we assemble in this garden of nature, fashioned by the hand of omnipotence, where the blue hills lift their heads near to nature's heart, midway in the stretch from Maine to Mexico, that we can for the moment forget geographical lines and remember only that we are equal heirs to the priceless heritage of a reunion, and that the narrow prudence of the puritan and the generous error of the cavalier—both good enough and bad enough in their way—are blended at last in the twentieth century American, more charitable in thought than either and equal in execution to both!

It is interesting, not to say something surprising, to note that coeducation in the colleges and universities of the United States was not adopted first in or near the recognized center of literary culture of New England, but that it had its birth in Oberlin College, Ohio, in 1833. From that date to 1870 a few colleges, located principally in the middle West, fell into line with Oberlin. Not until 1870 and 1872, however, can it be said that coeducation began to receive genuine and sincere endorsement at the hands of the leading educators of the country, finally culminating in its adoption by eighty per cent of the colleges and universities of the United States in 1898.

As one of the strong proofs of the growing popularity of coedu-

cation we direct your attention to the following statistical statement: "In 1890 there were studying in coeducational colleges 16,959 men and 7,929 women; or women, in other words, formed 31.9 per cent of the whole body of students. In 1898, a period of eight years, the attendance had increased to 28,823 men and 16,284 women in coeducational colleges, women forming 56.1 per cent of the whole body of students. Between 1890 and 1898 men in coeducational colleges increased 70 per cent, while women increased 105.4 per cent." The author adds, "There is every reason to suppose that this increase of women will continue."

Confronted with this formidable array of figures, supported by the fact just stated, that eighty per cent of the colleges and universities favor coeducation, how can we consistently oppose it in our dental colleges? Can we object on the ground that the woman has the smaller brain and is therefore of inferior mentality? This will not withstand the force of logic or observation, for did not the learned Professor Bishof argue woman to be an inferior creature, "Because she possessed a lesser quantity of gray matter than the average male?" and yet, *mirabile dictu,* a post-mortem found that "the professor had considerably less than the average female's allowance of brain." Can we object to woman's presence in the class-room on the supposition that she would lower the general average of the student body? This also is a cruel fallacy, as shown in the annual reports of the presidents of coeducational schools.

Shall woman be debarred from the dental class-room for physiological reasons, or sex relationship? We lay down the proposition that the class of women seeking a dental education will not be found among the frivolous, the undecided and the timid, or among the masculine and aggressive advocates of women's rights. We cannot in fair argument assume either. More likely she will prove a woman of determination, quietly bending her energies to the work of mastering a science; a thoughtful woman who has weighed the difficulties in the prospect, and steeled her resolution to meet them in patience and in dignity. False pride, yielding to common sense, will give her assurance that such few physiological tangents as may be necessary in the scope of a dental curriculum and discussion will be clothed in professional language and chastened by a consciousness that all that is said and shown in her hearing is for the single pur-

pose of instruction in a noble art. The moral question, as affecting coeducation, has never been raised in the art studios of the world where the sexes elbow each other in sketching from living models, nor has it been at all seriously considered in coeducational medical schools, where sexual relation and function enter so prominently in the lecture course.

The absolute efficiency of the trained nurse and assistant, who stands by the side of the operating table a witness to and willing helper in every form of surgical operation, has long since dissipated the thought of her incompatibility, or that her relation to surgeon or patient is any other than a veritable benediction to both.

Since, therefore, we find that woman's mental capacity is no hindrance; that because of her presence in the male class the general average is in no sense affected, and that physiological or moral reasons are not prohibitive factors to her seeking a dental education under coeducational conditions, coeducation in dental colleges should be fostered and encouraged for the greater reason of its refining and quickening influence upon the student body. From a limited personal experience in college work we can cheerfully bear testimony to the good effects of a woman's presence in the class-room, as not only affecting the student in his general conduct, but upon the lecturer as well, especially when tempted to adorn his well-rounded periods with a story better untold.

The refining influence of woman is well exemplified by Wendell Philip's story of the young man in the smoking-car, who excused himself for using questionable language by emphasizing the fact: "There are no women here." The majority report of the learned committee appointed to investigate the subject of coeducation in the Boston public schools in 1890, among other considerations favoring the system, said: "This check upon questionable utterances and acts is noticeable in all places where boys or young men are in companionship with the opposite sex, and *herein lies the greatest good resulting from coeducation.*"

President Angell of the University of Michigan in one of his annual reports employs the following strong language: "After our nine years' experience in coeducation we have become so accustomed to see women take up *any* kind of university work, carry it on successfully, graduate in good health, *cause no embarrassment in the administration* of the institution, and *awaken no special solicitude*

in the minds of their friends or teachers, that many of the theoretical discussions of coeducation by those who have not had opportunity to examine it thoroughly read strangely to us here on the ground."

While the foregoing testimony bears witness to woman's refining influence in literary schools, it must be remembered that moral influence is not a question of latitude or longitude, and if her moral force is for good among literary, why not among dental students? As final evidence on this point, hear our own Professor Peirce. Writing to us recently, he said: "I am now and always have been in favor of coeducation. It is now nearly thirty years since I admitted women to our dental school on the same footing as men. When it was first done I was much amused one day to have a committee of students present themselves in my office on what they considered important business. 'Well,' I said, 'gentlemen, what is the business?' They said they came to protest against women being in the class. I replied, 'Well, gentlemen, I believe you have not been asked. When I want your opinion on the subject, I will send for you, but I want to tell you now that the women are here to stay.' This ended the whole contest, and we have had women ever since. They first have a refining influence; there is less boisterousness, vulgarity and profanity; less spitting and other unseemly conduct. This of course has reference to the laboratory, but in the lecture room also they have a modifying influence, so that conduct is always improved by the presence of the female sex. I have no *private* opinion on this subject. I am unconditionally for coeducation. The rose always adorns the bush even though it is thorny."

Is Dentistry a Suitable Calling for Women? Though we have deliberately chosen to answer and support the affirmative of this proposition, fair assumption should throw the burden on those who would debar her, for surely woman ought not to be denied any acquisition of skill and learning that may bring her comfort and happiness, merely because she is a woman. Time was when she could not inherit property, when she had no legal existence save only as it was merged in the husband, but age did not sanctify error; courts of law gradually—reluctantly perhaps—but finally and distinctly abandoned the myth of a civil duality, and they now hear her in the forum and guard her rights to earn and own property and dispose of it according to her own sweet will.

Let us remember that not only the right of woman to find employment and earn her living is already established, but the necessity for it is upon many of them, and this necessity arises from many causes. Vital statistics show more females than males in the world's population, so marriage is impossible with all; the depopulation of the males through the vicissitudes of war, and the fickleness of individual fortune, are facts that must be faced with calm resignation, and should appeal to our humanity and enlist our best efforts as to how best to solve the problem, even if in the solving it should ultimately restrict man's sphere of activity.

Desiring to get an expression from an intelligent and appropriate source among the laity, we addressed a note to the president of a normal and industrial college for girls, asking him if he believed "dentistry was a suitable calling for women." He replied that he thought dentistry was entirely unsuitable for women, and gave three reasons, to wit: "1. The work requires constant standing on the feet, which is as a rule a bad thing physically for women. 2. The work requires a very considerable degree of physical strength, especially in the hands, and physical endurance. Women as a rule have not, I believe, the necessary physical strength and endurance for this work. 3. The work requires, I should think, remarkably strong nerves. Women as a rule have delicate and sensitive nerves, and are therefore unfit for this work." And this distinguished educator adds: "The above comments on women apply, I believe, to the *normal, healthful and well-organized woman.*"

Assuming that the objections here quoted voice in the main the sentiments not only of those of the laity who oppose woman's entrance into dentistry, but of the general practitioner as well, we shall adopt them as a basis for our contention. 1. Her physical condition being more delicate, she should not choose a vocation which requires her to stand on her feet during long hours. To this we answer that the same argument would apply with equal force to the thousands and thousands of saleswomen and shop-girls who must and do undergo this fatigue and discomfort, and if she be a "normal, healthful and well-organized woman, her capacity for endurance in her chosen field of labor should be equal to the "normal, healthful, and well-organized" man in his allotted sphere of action. The time consumed in standing at the dental chair by the average practitioner is infinitely less than that occupied by the average saleswoman, and

is certainly under more hygienic and comfortable conditions. That solicitude for women which trembles at the prospect of her encroachment on professional territory (hitherto occupied by men only), while it looks complacently on thousands of her sex toiling at *harder* work, seems strangely inconsistent with sympathy and deplorably deficient in logic.

The second objection raised by our critic is that "the work requires a very considerable degree of physical strength, especially in the hands." Barring possibly the strictly surgical feature of dentistry, in isolated instances this may be true; but for all other demands the strength of her hands is entirely adequate. We contend that no greater demand is made upon the hands of the woman dentist than upon the hands and strength of the girl who manipulates a typewriter or spends two hours daily at a piano exercise. Moreover, no such degree of physical strength is requisite to the successful practice of dentistry now as formerly. With present day methods and instrumentation brute force is placed at a discount, and knotted muscles are no longer a match for trained minds, clear eyes and a cunning hand, even though they be the mind, and the eye and the hand of a woman.

The day is not far distant—indeed, it may be said to have arrived already—when woman shall be no longer regarded as an exotic and when she shall be compelled to forego the natural trend of her inclination by reason therefor. The Federation of Women's Clubs and other agencies have done and are still doing a great work to emancipate their sex from a chronic anemic condition, by the introduction of dress reform and by encouraging every form of rational physical exercise. The institutions of learning throughout the country have caught the infection, and at Wellesley College alone "one thousand young women are required to enter into a thorough course of physical training," and according to the authority we quote, "It is represented that these students pride themselves on their excellent physical condition, which they first endeavor to attain before subjecting themselves to serious mental strain." In 1898 there were 1,397 women studying medicine in the United States, 174 studying pharmacy, and 162 studying dentistry. Which of these three is the greater test of one's physical endurance? To ask the question is but to answer it.

The third and last objection raised by our distinguished friend is,

that "the work requires, I should think, remarkably strong nerves. Women as a rule have delicate and sensitive nerves, and are therefore unfit for this work." We answer that a women with a nervous organization is not likely to seek dentistry as a profession, nor does this criticism apply to women with any greater force than to nervous, sensitive men. When a woman obtains consent to seek employment in untried fields—in man's so-called exclusive domain—she is presumed to have investigated their exactions and requirements. Indeed, such a woman will likely be endowed with not only sufficient physical courage, but marked individuality as well, a trait of character most prominent in those men who have achieved success in their respective vocations. Is it not rather late in the day to offer "delicate and sensitive nerves" as a barrier, when Clara Barton and thousands of her followers have long since shown this to be a mere figment of the imagination by their heroic conduct in the hospitals, the sanitariums, and on the battle-fields? Many a woman who would swoon at the sight of a mouse will bear more fatigue and witness with more calmness nerve-racking scenes at the couch of pain than the biblical Hercules who slew the lion and pulled down a temple.

While our distinguished critic failed to note what would prove perhaps the most serious drawback to woman's entrance into dentistry, namely, her probable deficiency in mechanical execution, we shall anticipate the objection and meet it as briefly as possible. If we are correct in our premise that a woman seeking a man's vocation does so from a natural inclination, or an innate love and fitness for the particular work chosen, the logical inference is that she possesses more or less ability to sustain her in her choice. While every woman is not endowed with the constructive mind and dexterous hand of a Rosa Bonheur, no one will deny that she is at least eminently imitative. What is more exacting, not to say exasperating, when the model of fashion demands of the present-day dressmaker that her gown shall be so constructed as to simulate the outlines of a Venus? But she does it, and yet she has not the advantage of a plaster impression, into whose irregular form the plastic material may be moulded; but she must rely upon an exact measurement in inches, guided by an unerring eye for symmetrical curves and geometrical lines.

But why indulge further in speculation when over five hundred women dentists have already arrived and are practicing while we

preach? It has been our privilege to meet her in the lecture room and at the clinic, and we failed to discover any want of application or lack of understanding to distinguish her from other students. On the contrary, in theory she was equal to and surpassed many, while at the chair the proof of her handicraft in no wise suffered by comparison. In not a few instances we also discovered in her development of individuality of character and genius for expedients, elements ofttimes so needful in the mastery of a difficult problem.

The prospect of a cultured woman writing D. D. S. after her name and putting money in her purse need stir our sympathies not half so much as the picture of a sad face and figure struggling for sheer existence in the orthodox sphere of home. Take it where you will, there lives a woman who must face the problem of existence and learn to take care of herself, to say nothing of the stubborn fact—more is the pity—that she has been known to take care of her husband also. And if it should come to pass that woman in her loveliness shall be woman in her strength, with womanhood never diminished, we in manhood's generosity must not hinder but hold the door of opportunity ajar and at least give her entrance to her wish in the field of endeavor. If she fails she first will find it out. If she wins we first shall place the laurel upon her brow and welcome her to her just reward.

But however much we may philosophize we must finally accept the conclusions of Kate Field when she said:

> "They talk about a woman's sphere as though it had a limit!
> There's not a place in Earth or Heaven,
> There's not a task to mankind given,
> There's not a blessing or a woe,
> There's not a whispered yes or no,
> There's not a life, or death, or birth,
> That has a feather's weight of worth,
> Without a woman in it!"

Discussion. *Dr. H. A. Smith,* Cincinnati: I have the honor of being connected with the college which graduated the first woman in dentistry. That was in 1866, when Prof. Taft was dean of the Ohio Dental College. After starting in practice this woman at first received little sympathy or support from her own sex. Her women patients were critical and sometimes even abusive if any mishap oc-

curred in the treatment of their cases. All this has changed, and now women and children are largely the patrons of the women dentists. As to their success, it may be stated that they usually succeed in establishing a lucrative practice in a shorter time than do the men. I speak now of the women dentists who escape matrimony and the cares of a family, which latter do not as a rule contribute to their success. The belief expressed that women are temperamentally unfitted for the practice of dentistry is not well founded. The woman who takes up this work seriously is able in a short time to overcome the timidity or nervousness which may possess her at first. As stated by our essayist, the presence of women in the classes gives dignity, and although their influence in the college is wholesome. My only objection to women in dentistry is that the work is too hard for them. The practice of our profession is both exacting and laborious, and I am old-fashioned enough to believe that all the real hard work in the world should be done by men.

Dr. Jonathan Taft, Cincinnati: This woman to whom Dr. Smith refers was a student in a dental office in our city. When she applied for admittance the teachers and even the trustees of the college objected, but she was finally admitted. The benefit accruing from having a woman in the class was never more manifest than in that case. She would not permit the use of cigars or cigarets in the laboratory, she objected to the boys chewing tobacco, and anything she did not regard as proper she criticised, until the conduct of the students was revolutionized. We have had from three to ten women each year in our classes at the University of Michigan, and I have watched them carefully and studied this question. As the years go by I become more and more convinced of the feasibility, practicability and efficiency of women in the practice of dentistry. On the average their success is more uniformly good than that of the men, and in almost every instance they have succeeded. In one case a man and woman were married when they graduated. The husband proved a failure as a dentist, but the wife has a lucrative practice and in addition takes good care of three children. A woman has the strength necessary for the extraction of teeth or any other operation, and it does not require as much strength to practice dentistry as it does to cook, scrub floors or stand over a laundry tub all day, or even as much as it does to meet the demands of a family of children and take care of a house.

Dr. Garrett Newkirk, Los Angeles: I wish to express my admiration for the most excellent paper on this subject that I have ever heard. It states exactly my experience in the college which I represent, for I consider our women students a great addition to the classes, and they are a comfort to every teacher. The finest operator, the best gold worker, in our last year's graduating class was a woman.

Dr. C V. Vignes, New Orleans: In a class of eighteen in the New Orleans College a frail young woman carried off all the honors, excelling especially in prosthetic and operative dentistry.

Dr. H. A. Smith: Recently in our city some have been advocating that young women be trained in our colleges for the special work of dental prophylaxis. As outlined by Dr. C. M. Wright, this training would consist of lectures on the anatomy of the mouth and teeth, special pathology and physiology, and a special clinical training in prophylactic therapeutics. It is suggested that after finishing the prescribed course the colleges should issue a certificate showing competency. It is assumed that some of these young women would seek employment in dental offices, while others would receive patients in their own apartments or visit them at their homes. These subspecialists would confine themselves strictly to the practice of oral prophylaxis, and if they should be tempted to engage in general practice they could be curbed by the present state dental law.

ETHNOGRAPHIC ODONTOGRAPHY—(3) SOME MEXICAN TRIBES.

BY A. H. THOMPSON, D.D.S., TOPEKA, KAN. READ BEFORE THE NATIONAL DENTAL ASSOCIATION, AT ASHEVILLE, N. C., JULY 28-31, 1903.

The ethnology of Mexico is beyond definition. It is so complex, heterogeneous and endless in variety and extent that anything like a systematic classification has never been accomplished. The "Catologo de la Coleccion de Anthropologia" of the National Museum of Mexico enumerates over 500 tribes as belonging to the Familia Mexicana within historic times. These tribes in all the centuries known to history, both Indian and Spanish, have been a heterogeneous and incongruous mass of peoples. In ancient times

they moved about more or less, but never founded a harmonious body politic, as apparently might have been possible, from contiguous association. In different districts ancient types yet remain as distinct as in the time of the Spanish conquest, and pure blood peoples are not uncommon in our day. Some are noted for their beauty of form and feature, as the inhabitants of the Isthmus of Tehuantepec, and other tribes near them are noted for their ugliness and repulsiveness. These are pure types and have remained unchanged for centuries, and they are so entirely different as to present difficult questions of ethnic relationship. Many tribes, nearly contiguous geographically, are so foreign to each other in physical characteristics that they might have come from far separated parts of the globe, for there has apparently been but little intermixture.

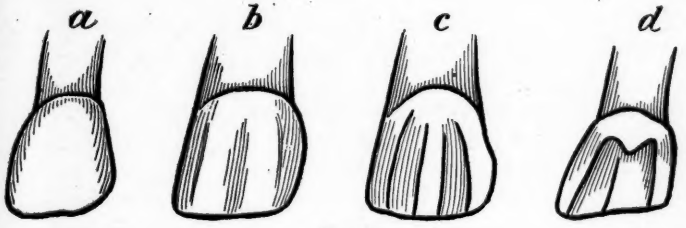


FIG. 1.

Upper centrals of Mexicans. *a*. Narrow neck. *b*. Wide neck. *c*. Ridges on labial face. *d*. Ridges on lingual face.

In regard to the general classification of the tribes of Mexico, Mr. H. H. Bancroft in his "Native Races of the Pacific States" says (II, 91): "In aboriginal America (Mexico) in art, thought and religion there is much reason for referring all the native civilizations to two branches, the Maya and Nahua—the former the more ancient, the latter the more recent and widespread. Of all the languages spoken among these nations the two named are the most widespread and are likewise entirely distinct. * * * Very many nations not closely affiliated with each other show evident traces of both cultures, and may be supposed to have developed this condition from contact and intermixture with the two parent stocks, but this is only general, since there are many nations that show neither Maya nor Nahua affinities. Too much importance is not to be attached to the names Maya and Nahua. The former is adapted to that which is most ancient in the Central American region, where

formerly flourished the civilizations that left such wonderful remains at Palenque, Uxnal and Copan—the latter, the Nahua, as being an older civilization than either the Aztec or the Toltec, both of which the Nahua stock includes. * * * The civilization of what is now the Mexican Republic, north of Tehuantepec, belonged to the Nahua branch, both at the time of the conquest and throughout the Indian historic period preceding. Very few traces of the Maya element occur north of Chiapas and these are chiefly linguistic. * * * The Aztecs are taken as the representatives of the Nahua element, but the truth is that the Aztecs were only one tribe, the most powerful of a league or confederation of three nations which in the 16th century from their capitals in the valley ruled central Mexico. These three were the Aculhuas, the Aztecs and the Taponecs, and their prospective capitals were Texcuco, Mexico and Tlacopan (Tecuba), which were near each other on the lake borders. * * * Under the leadership of a line of warlike kings Mexico extended her domain to the shores of either ocean and made the tribes therein tributary to her, but the Aztec kings gained prominence, so that the name Aztec came to be applied to all of the absorbed nations of central Mexico. * * * Many of those nations were of the same blood as the Aztecs, being also of Nahua stock. All their civilization was therefore more or less ethnic. The conquest of the included nations was, however, indifferent and incomplete, and some of them, indeed, were never conquered at all. * * * Of these independent nations one of the most flourishing was that of the Tarascans of Michoacan, westward of the Mexican valley. In institutions, manners and wealth the Tarascans were the equals of the Aztecs, and their superior warlike qualities enabled them to successfully resist the Aztec arms. * * * Their civilization was of the Nahua type, but their language was different from the Aztec tongue. The nation was probably a remnant of the old Toltec empire. In physical development they were superior to the Aztecs. * * * The Zapotecs and Mixtecs occupied the state of Oaxaca. They were distinct in type and from each other. They extended their supremacy over all the tribes of Tehuantepec and constructed the wonderful buildings of Mitla. * * * East of the independent kingdom of Tlascalla was the region of the Totonacs, who were probably a pre-Toltec people, like the Otomies and the Olmecs, who formerly occupied the country and probably built the pyramids of the Sun and Moon at Teotohuacan. They were related to the

Nahuas and their architectural remains would indicate such relationship."

The physical characteristics of the people of Mexico are as varied as their ethnic affinities and differences. Bancroft says, "Various opinions have been advanced by competent persons in regard to the features of the natives of Mexico. Mr. Humboldt describes them as resembling the aborigines of Canada, Peru, Florida and Brazil; having elongated eyes, the corners turned upward toward the temple; prominate cheek bones; large lips, and a sweet expression about the mouth, forming a strong contrast to their otherwise gloomy and

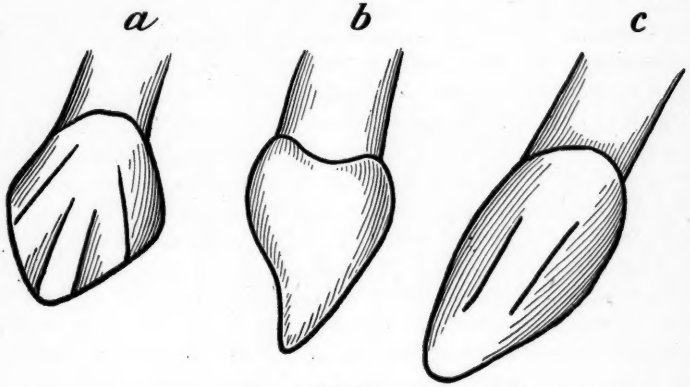


FIG. 2.
Upper cuspids. *a*. Spear-shaped crown. *b*. Mesial view. *c*. Conical form.

severe aspect. Others say that their eyes are oval and that their physiognomy resembles that of the Asiatics. According to Prescott, they bear a strong resemblance to the Egyptians, and Le Duc asserts that the Malay type predominates. They have generally a very narrow forehead; oval face; long black eyes—set wide apart; thick lips; teeth white and regular, and nose small and rather flat. The general expression of the face is melancholy, and exhibits a strong combination of moroseness and gentleness." (The centuries of Spanish misrule and oppression through which these people have passed are quite sufficient to account for the universal hopelessness and despairing expression of the Mexican faces.) " * * * The nations of the valley of Mexico are over rather than under the middle height, well made and robust. In very many they are some-

what shorter, four and a half to five feet, but stout and clumsily made. The women are shorter than the men and are fully developed at a very early age. In Jalisco both sexes are tall, and they are also well built. Among the women are found forms of such perfection that they might well serve as models for the sculptor. Throughout the table-lands the men are muscular and well proportioned. * * * Although some very handsome women are found among them, the majority are not so in old age, which with the women begins early. Their faces are much wrinkled and the features quite harsh. * * * Long, straight, black and glossy hair is common to all; the beard is scanty on most of the men, especially in the capital and its vicinity, where a small mustache is worn. They are remarkable for their strength and endurance, which may be judged by the heavy burdens which they carry on their backs. The inhabitants of the table-lands are of various hues of skin; some are olive, some brown, others of a red or copper color; on the sierra there is a bluish tint of the skin, as if dyed with indigo. The natives of the Tierra-Caliente are of darker complexion, inclining to black. The Indian pintos, whose cuticle is of less deep color, inclining more to yellowish, are marked with dark copper color in spots. * * * The Zapotecs are well-formed and strong; the features of the men are of a peculiar cast and not pleasing; the women are, however, beautifully formed and graceful, with handsome features. Another tribe of the same nation, the Zapotecs of Tehuantepec, are rather under the medium height, with pleasing oval face and fine personal appearance. A few of them have light-colored hair and fair complexion. The women there also have regular and handsome features, small stature and graceful carriage, with dark lustrous eyes, and are noted for their beauty. Then, again, others near these handsome people are remarkably ugly. The natives of Oaxaca are generally large and well formed; those of the Sierras are of a light yellow complexion, and the women are very white with mild features. Father Burgois in 1540 speaks of the Mixtecs as having beautiful complexions and fine forms. They are of great strength, well built and active. Some others there wear a beard and their aspect is repulsive. * * * In an Oaxaca village shortly after the Spanish conquest the people were reported as being of gigantic stature. * * * The natives of Tobasco who dwell on the river are of medium height, with well developed limbs, flat faces, low foreheads and small eyes, flat noses, thick lips, small but full mouths,

white teeth and a tawny complexion. The Ahualcas are rather under the middle height and of great physical strength. They have a low, narrow forehead, prominent cheek bones, full lips, white teeth, small eyes and coarse hair. Their features are aquiline and their expression melancholy. They strongly resemble the descendants of the Aztecs of Mexico valley. The women are more delicately made and some of them are very beautiful."

Prof Frederick Starr of the University of Chicago has made some extensive anthropometric examinations of the people of Mexico, which are published in the decennial publications of the university, under the title of "The Physical Character of the Indians

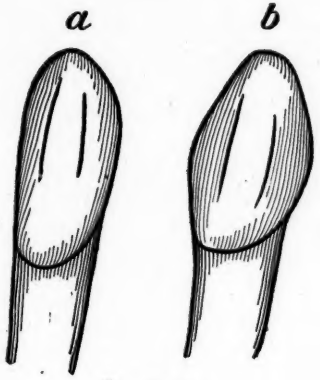


FIG. 3.
Lower cuspids. *a*. Ordinary conical form. *b*. Spear-shaped form.

of Southern Mexico." These studies are very elaborate and the data were very difficult to obtain. They were made during several extended trips into the region. His descriptions of the physical characters of the people are intensely interesting and valuable, and throw a flood of light upon the inhabitants of this little-known region. They show that little change has been wrought by intermixture during the lapse of centuries, and that the people remain nearly the same to-day as before the conquest. Prof. Starr dwells upon the great differences and variations that exist among the tribes examined in regard to language, art, culture and physical character. He took measurements, photographs and plaster busts of 125 individuals of each of 23 tribes. He says, "The only classifi-

cation basis of Mexican tribes has been linguistic, but the relationships indicated by language did not harmonize with the evidence of physical characters as much as was anticipated." In regard to the cephalic index he says: "It ranges in these tribes from 76.8 to 85.9. Adopting Topinard's nomenclature we find no dolicocephalic or subdolicocephalic tribe, but five mesaticephalic, seventeen subbrachycephalic and one suprabrachycephalic. * * * The Indians of the United States are mostly subdolicocephalic. Among some of the examined tribes the index rises. * * * The nasal index is of the greatest interest, and the actual form of the nose varies greatly. Many of the tribes have finely aquiline noses and others are broad and flat. None of the tribes is leptorhinian. A few are platyrhinian and the rest are mesorhinian.

"The Otomies are of little stature and have absolutely the longest heads of all the tribes examined. * * * There appear to be two types of males—one tall and light yellowish, curiously blotched with red, yellow or blue; the nose is broad and the oblique eyes are widely separated; the beard is scanty and the hair black. The other tribe is little, dwarf, brown, and has a much more agreeable expression than the broad, flat face of the first. The eyes are widely spaced and the eyebrows often meet. The root of the nose is flat. The women are more uniform and darker than the men and resemble the dark type. They are little in stature and vary from yellow brown to dark brown; the face is flat, the nose broad and flat, the cheek-bones wide and the head very long. The heads of the women and of the little men are peculiarly high.

"The Tarascans are among the tallest of the tribes, less than half being of little stature. Though taller than the Otomies, their neighbors, their heads are shorter. The skin is a fine dark brown; the face is large; the nose is broad and round; the eyes are often mongoloid, and the lips are thick and protruding. The older type has a longer face; the nose becomes narrower; the eyes straighter and more widely separated. The beard is scanty. The women are fleshy and disposed to goitre. This is common with the men also.

"The Aztecs examined were from Cheluda and Tlaxcala. Like the Tlaxcalans, the Aztecs are tall, and their heads are shapely, with a curious bulging of the forehead above the glabella. They are brachycephalic and narrow-nosed. The skin is a fine dark brown, shading at times toward yellow brown or red brown. The hair is black and straight and the beard scanty. There is a large per cent

of light brown eyes, but the most are dark. The tip of the nose is often thick, and the lips are often thick and somewhat projecting.

"The Zapotecs of Mitla are not well defined. They are in the category of 'little statures'; the cephalic index is subbrachycephalic; the nose is long but seldom aquiline; the eyes are mostly dark; some black eyes occur; the lips are thick but project but little. The Zapotecs of Tehuantepec present the finest Zapotec type, although they may have some admixture of Spanish blood. They are the tallest of the 23 tribes examined; are subbrachycephalic and messorhinian; the eyes are usually dark brown, but some are light; a few are oblique; the lips are rather thick and projecting; a large hatchet face is rather common; the skin is dark brown, but varies.

FIG. 4.

Upper bicuspids. *a*. Flaring form of buccal face. *b*. Oval form. *c*. Occlusal face, showing wide buccal cone and very narrow lingual. *d*. Oval form of occlusal face.

The women are large and tall—quite so for the men—and are famous for their beauty of form and feature and for their vivacity. Some travelers pronounce them the handsomest women in the world."

These are a few of the many varying types that the inhabitants of Mexico present, indicating the great and extreme variety of the physical features. They are apparently widely distinct, yet they are all of one race and are all of undoubted Indian blood. My studies were made of the skulls and teeth of but a limited number of tribes. Those from the City of Mexico and vicinity were probably mostly of Aztec stock, and after the Aztecs the Tlatelolcos, of the same Nahua race. Those of the Mexican valley were probably of Nahua stock also. Those from the north, the tribes of Chihuahua, are fragments and are greatly mixed. Those from Michoacan are all Tarascan, and are more homogeneous and distinct from the others.

Those from Jalisco and Xico are also compact, but the Zapotecs, Otomies, those from Teotohuacan, etc., are but fragments. The data herewith presented are therefore from mixed and various sources, but a general type for Mexico could not be made out from any quantity of material; the most that could be done would be to make generalizations and deductions for separate tribes. My material was considerably from the City of Mexico—the Tlatelolcos and others—Mexico valley, the Tarascans of Michoacan, Jalisco, Xico, Chihuahua, and from those tribes I could make some reliable deductions. The rest were scattered and miscellaneous and the tribes represented will need to be studied more fully. Taken altogether I examined about 400 skulls and jaws and 500 or more loose teeth. This is not a great number, but it furnishes reliable data as far as it goes. Mexican skulls are very scarce in our museums, and the main part of my material was found in the American Museum of Natural History of New York and the National Museum of Mexico. Some skulls were also found in the Museum of the Academy of Natural Sciences of Philadelphia, the Museum of Art and Archæology of the University of Pennsylvania, and the Field Museum of Chicago. [NOTE. To the officials and custodians of these museums I must express my thanks and gratitude for the kindness and courtesy shown me in the pursuit of my investigations. My work was also greatly facilitated by the generous assistance furnished by the attendants in these institutions, for which I thank them also.]

The heterogeneity of the tribes of Mexico would of course foretell the heterogeneity of the skull and jaw forms as well as of the teeth. No comprehensive generalizations could be made for the whole of the miscellaneous peoples examined, for there was no uniformity except within the narrow limits of a tribe or region, and even among those there was often great variation of physical characteristics, as has been noted, so the data presented are of value only so far as the limited area of the tribes examined is concerned.

The Skull Forms. The cranial conformations of course presented great variation, yet there are some deductions to be made that may be useful for comparison, within tribal limits. For instance, the skulls from the region of Mexico City and the immediate Mexican valley, the Aztecs, Tlatelolcos and others of Nahua stock, were decidedly round and high, with a remarkable prevalence of high

sagittal ridges. The cephalic index was subbrachycephalic with very little dolicocephaly, and few bulging occipitals. There was some fronto-occiptal flattening, with consequent bulging of the parietals; rarely a deep valley ran over between the parietals, but there is some doubt as to whether some of the occipital compression might not be due to earth pressure. Or, again, it might be natural, for some of the living Mexicans exhibit a decided flatness of the back of the head. There were, however, some skulls with very apparent fronto-occipital flattening, of which there could be no doubt, such as is produced by the ordinary cradle-board pressure. This is not uncommon among the Indians in various parts of our hemisphere,

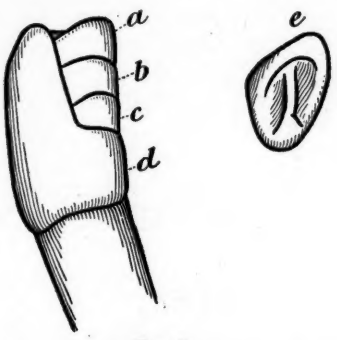


FIG. 5.

First lower bicuspid. *a*. First position of lingual cusp. *b*. Second position. *c*. Third position. *d*. Fourth position. *e*. Occlusal face, showing peculiar form of disto-lingual projection.

north and south. But there was no elongated compression by band-aging, such as was practiced by the Aymaras of Peru, and noted by me. [NOTE. For this and other references to the "Ethnographic Odontography of the Inca-Peruvians," see DENTAL DIGEST for January, 1903.] The forehead was full, with low brow, and the glabella was not infrequently very prominent. The skulls examined were mainly those of the Tlatelolcos in the National Museum of Mexico.

Among the Tarascans of Michoacan the skulls were large and round, a decided brachycephaly. The middle was high, but there was not so much of the prominence of the sagittal ridge as in the Mexican valley. There was a tendency to dolicocephaly in some, perhaps foreigners, with the frequently accompanying full and even bulging occiput—there being much more of the latter feature than

with the Tlatelolcos and Aztecs. The forehead was round and full. Occasionally the valley over between the parietals was distinct. Very few compressed skulls were observed—not one in fifty—and none at all among the Tarascans proper. The Tarascan skulls examined were in the American Museum of Natural History of New York. The skulls from Jalisco (same museum) were large and round; high in the middle; a few with sagittal ridges; some with bulging parietals, some with full occiput, and a decided tendency to dolicocephaly; the forehead was narrow and full, and the brow full. There were no compressed skulls, but some with slight occipital flattening, straight and oblique, which might be natural or earth pressure.

The skulls from Xico (National Museum of Mexico) were round, with full parietals; some with sagittal ridges, and some with very full occiput. There was some decided fronto-occipital compression, with consequent heavy bulging of the parietals, in a few skulls. The skulls of the different tribes of Chihuahua (from various museums) were generally round and large, with high middle. A very few had the anomaly of the double sagittal ridge. There were many that were long behind, with the full occiput and decidedly dolicocephalic. The full parietals with the valley over the back were also found. The forehead was narrow with full brow. The miscellaneous skulls from different regions, Teotehuacan, Otomies, Huextla, etc., exhibited much the same features.

Although few generalizations can be made, the principal one that I feel safe in deducing is that among the Mexican skulls noted there is a decided predominance of brachycephaly, with high middle of the skull. Dolicocephaly is rare, but is present in some localities, although I was unable to connect it with any particular tribes. Inca bones were found so often that I ceased to enumerate them—they occurred in almost every skull.

The Jaws and Dental Arch. Here also the many variations produced great heterogeneity in the types of the jaws and arches presented. There was also much irregularity and contraction of the arches in all of the groups, which are not enumerated in discussing the apparently normal types. The cranial index and the gnathic index bear a more or less close relationship to each other. Mexico City and valley presented a variety that cannot be classified. The Tlatelolcos had a round arch and a deep vault as a rule. These and

other round arches were evidently related to the prevailing brachycephaly. There was a decided absence of squareness of the arch. The arch of the Tlatelolcos was always round, with a disposition to converge at the rear. The miscellaneous Mexicans of the city and valley were usually round also. The latter presented the average width of the upper arch at the first molars of 6 cm. The variations from this were very slight. The Tlatelolcos were also near the 6 cm. average, although a few were above that limit, and many as low as 5 cm. 5mm. Their jaws were small and delicately formed, and indicated, as the skulls did, a race whose physique had been affected by enervating living. They were removed from savage structure and quality. At St. Simon and other valley places V-shaped and contracted arches were not uncommon. The impressive fea-

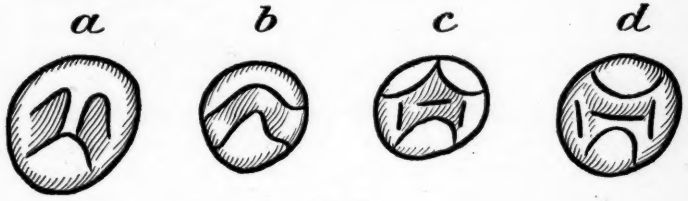


FIG. 6.

Second lower bicuspid—occlusal face. *a*. Transverse ridge form, like first bicuspid *b*. Crescent form of lingual cusp. *c*. Tricuspid form. *d*. Bicuspid form.

tures in this group were the large round arch and the deep vaults. The facial index was usually orthognathous or suborthognathous, for very few were prognathous, the latter not usually being associated with round skulls except in very rare and exceptional races. The very full forehead also affected the facial index. This feature is noted by Bancroft and Starr in living races—the descendants of those whose skulls I studied. The racial features have been kept pure and unmixed in many tribes in Mexico for centuries.

The Tarascans of Michoacan presented the general average of 6 cm. width of the arch, although there was much variation. Some few reached 7 cm. and many were down to 5 cm. 5 mm. The arch was generally round and the vault deep. A few V and round-V arches were found, but very few square arches were present. Some converged at the rear and others diverged. A very small number was square and prognathous, the form of facial angle being orthognathous almost entirely. A few vaults were flat, but the most

were deep with round roofs. In those from Jalisco the jaws were round and arches rather small. The average width was 5 cm. 5 mm. to 6 cm.; many vaults were low and flat, but the arch was wide and round. A few were round-V, but the most were quite round, some converging at the end and others flaring, but very few were square.

The jaws from Xico were very large, the vault deep and the arch round. The average width was 6 cm. 5 mm. The arches were sometimes disposed to squareness. The Otomies, Zapotecs, St. Juan Teotohuacans, Huextlas and others had large round arches and deep vaults. The average width was 6 cm. 5 mm. The tribes of Chihuahua generally averaged smaller—5 cm. 5 mm.—very few being above 6 cm. The form of the arch was generally round, with many round V-shaped. The vault was usually deep, a very few being low. The surprising thing was the number of round V-shaped arches, meaning those, of course, not deformed but apparently normal. A few large square arches were observed, especially from Casa-Grande.

The Teeth of the Mexican tribes examined of course presented great variations, and had a few conspicuous characters that are of special interest. The one remarkable ethnic-dental feature of the Mexicans is the excessive smallness of the bicuspids. This was noted to a degree among the Peruvians (op. cit.), but with the Mexicans it was extraordinary—so much so as to be a positive ethnic feature. Whether this peculiar feature will be found to prevail among other tribes than these here observed will remain for future investigations to decide, but as there is a general racial connection of all the tribes of Mexico this feature will probably be found general. Other features of minor importance but of special interest were found, which will be noted in the detailed descriptions.

As regards diseases, abnormalities, malpositions, etc., there was the usual amount that we have become accustomed to expect among peoples who are not essentially primitive. The civilization of the Mexicans, such as it was, induced some kind of enervating life and consequent degeneracy of structure that had its effect upon the teeth. There was marked malposition of the teeth in many cases, so much so as to cause surprise. Not many jaws were much contracted, but a few were saddle-shaped, and a few V-shaped from crowding and malposition of the teeth. Caries, abscess and calculus

were not uncommon. Owing to the prevalence of syphilis there was much to be observed of its effects upon the bones, although no notched teeth came under my observation. Destructive abrasion was not so common as with the Peruvian skulls, so that the general effects of wear were not so marked. As the diet of the people was necessarily coarse this is rather surprising. Taken altogether, I found the effects of degeneracy in a marked degree as reflected in the jaws and teeth. The absence of one of the upper centrals was a feature in some of the skulls, and curiously enough this was also observed frequently on the streets of Mexico City in all classes. A practitioner assured me that it was due to an obstinate disease of the

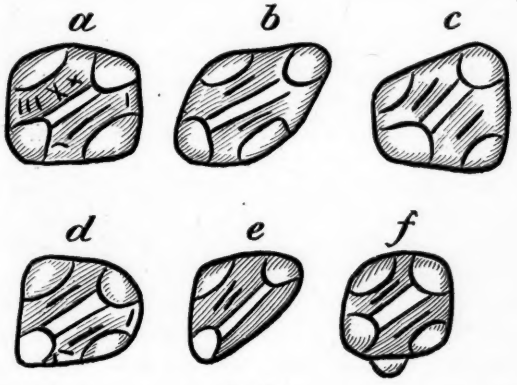


FIG. 7.

First upper molar—occlusal face. *a.* Usual square, normal form. *b.* Diamond form, paracone and hypocone reduced. *c.* Trapezoidal form, paracone and protocone reduced. *d.* Trapezoidal form, metacone and hypocone reduced. *e.* Triangular form, hypocone entirely absent. *f.* Fifth cusp, hypoconule, added to protocone lobe.

gums, of deeper origin than pyorrhea. The coincidence of the loss of the central incisor in both the ancient skulls and their living descendants was quite impressive.

The upper central incisors of the people of the City of Mexico and the valley presented some interesting features. The National Museum of Mexico had, in addition to the skulls, many hundreds of loose teeth of the Tlatelolcos, which gave a complete representation of the dental peculiarities of these people. The upper centrals among them had the main feature of a wide face for the lower half of the crown, the upper half converging to a narrow neck, with a

deep fossa on the lingual face with high ridges (Fig. 1). Some few had long crowns with wide neck and round face. Ridges on the labial face were very rare, this being a low and simian type. A rare form was a long crown, wide to the neck, with enamel extending high up on the neck, and the labial ridges well marked. This type must have been intrusive, for it is of decidedly savage and primitive relationship. There was but little variation among the Tlatelolcos from the main type of the wide lower half of the crown, narrow neck and deep lingual fossa. The roots were usually long, some of them having great length. Very short "stubby" roots were rare—such as are often found with extra large, wide crowns. There was not as much wear of the incisors as is usual with such races as the Indians. The Mexican valley tribes presented much the same type.

Among the Tarascans the prevailing type of the centrals was that of a very broad or flat face, and wide neck. There were some with narrow necks and wide crowns, but the majority were long and flat. The labial face was smooth, with little suggestion of ridges. The lingual fossa was not deep, and consequently there were but slight lingual ridges. Some of the anterior teeth had notches filed in the edges of the crowns, as was a ceremonial custom of some sort with the Mexicans, and this marking shows in their idols also. In Jalisco the centrals were of the wide crown and narrow neck variety. From Xico they were of the same shape, with occasional cases of ridges on the labial face, showing this primitive type. Those from St. Juan Teotohuacan had the type of wide face, narrow neck and deep lingual fossa. Some few had labial ridges. The Zapotecs were the same. In the miscellaneous collection of tribes of Chihuahua there were some which had the primitive labial ridges, with wide crown and wide neck, a very low type. Some, however, had wide lower crowns with narrow necks, but they were exceptions.

Taken altogether, I found two distinct types of incisors, which, with a more exhaustive examination, might be found to be associated with a distinct ethnic family. The first type was that of the lower half of the crown with a narrow neck, smooth labial face and deep lingual fossa with high ridges. The second type was that of the wide crown, short or long, with a wide neck, well marked labial ridges and smooth lingual facial modifications. A third type was rather aberrant, with a very large smooth crown and very short

root. These types were found in various combinations, of course, yet they were distinct.

The upper lateral incisors among the Mexican tribes examined presented some interesting features, and yet were not as variable as we might expect. There was comparatively little degeneracy in form—such as is common in the lateral in Europeans. The peg-shaped form, for instance, was most rare, and total absence of the tooth almost unknown. In some tribes the degeneracy was more marked than in others, following the same line of degeneracy of associated parts. Among the peoples of Mexico City and valley —especially the Tlatelolcos—it was usually of good form and followed the centrals as regards the special types it exhibited. It had the wide crown and narrow neck of the centrals of the Tlatelolcos, with very deep lingual fossa and high ridges. Labial ridges occurred in some low types, as on the centrals. The lingual

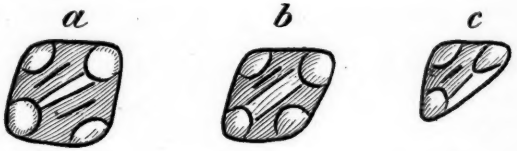


FIG. 8.

Upper second molar—occlusal face. *a*. Square form, like first. *b*. Hypocone reduced. *c*. Triangular form, hypocone entirely absent.

basal ridge was sometimes cut by the groove which often runs across this ridge and over onto the neck, but this defect was not common. A peculiarity was a deep groove extending across the distal face and over onto the labial face in several cases. The rare reversion to the primitive lateral form of the high cingule on the lingual face rising to the level of the edge—making a bicuspid type —was observed in a few cases. Peg-shaped crowns were rare. The mesio-labial angle depression occurred in some. The roots of the laterals were long and flat, with the obtuse hook in many cases. A few roots were rather short.

The Tarascans had laterals that were not so full shaped, but were rather degenerate, the peg shape being not uncommon. Some were flat-faced, narrow neck, deep lingual fossa, and groove over lingual ridge. Deficient crown and wide neck were common. Some were of good shape, but not many. Those from Jalisco, Xico, St. Juan,

Teotohuacan, etc., had the laterals of good shape—wide crown, narrow neck, lingual fossa, etc. From Zapotec the crowns were small and narrow. From Chihuahua the laterals were rather wide and flat, with narrow neck, lingual fossa, etc. Among this mixed lot there were, of course, many different forms. There were some cases where it was totally absent and the arch was closed.

The lower incisors presented little variety, as might be expected. In the strong types they were full and square, the width of the centrals and laterals not being as unequal as with the higher races. The edge of the lateral was usually wide and square, the distal angle being but little round. The size of the neck varied in the same way as between the higher and lower types, as the centrals. With the Tlatelolcos the lower incisors were unequal and narrower than with some other tribes. The Tarascans were marked by the very wide edges of both centrals and laterals—the differentiation as between those teeth in higher races not being apparent. In those from Jalisco, Xico, Teotohuacan and the Otomies this type also prevailed. The Zapotecs had them smaller and narrower. In Chihuahua the various tribes presented considerable variation, both wide and narrow being found. There was among most of the tribes examined considerable irregularity of these teeth, malposition and tortion being frequent.

The upper cuspids presented some strong characteristics that are of interest. Some of them were worn and dry-fractured, but the number of whole specimens was unusual. They ranged from small to medium, not being very large or long. This is in harmony with the prevalent round arch among the Mexicans, which is not characterized by as large, prominent cuspids as the square arch, in which they stand out so noticeably at the corners. The two prevailing types were the wide, spear-shaped crown, usually short, and the long conical crown, and their variations. (Fig. 2.)

Among the Aztecs and Tlatelolcos of Mexico City and valley these range from the small, short crown with wide face to the large, long and conical type. The variations seem to be very great. A few have the good spear-shape of the labial face, with flaring distal and mesial borders; others have the full, round labial face with reduced borders and of a distinct conical shape. An average as to the proportion of the two forms would be difficult to make. There were only a few very large cuspids of the long, thick, strong variety, with thick necks and long roots, but short roots were most

common. Labial and even lingual ridges of any prominence were most rare.

Among the Tarascans the cuspids were generally of large spear-shape, the distal prominence being much in evidence. There were quite a number of conical-shaped crowns, but not so many as among the Mexican valley tribes examined. The roots were sometimes long but generally medium, and the labial and lingual faces were smooth with little evidence of ridges. Some of the cuspids, like the incisors, had notches filed in the edges.

In those from Jalisco the cuspids were generally short, with full round face, thick neck, and but slightly flaring or spear-shaped. From Xico they were remarkably large, long and conical. The Otomies and the Teotohuacans were large and rather spear-shaped, some being conical. The Zapotecs were round and wide, of decided

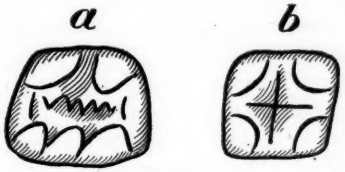


FIG. 9.

Lower second molar—occlusal face. *a*. Five cusped form of normal first molar, found (as ancestral type) as a reversion in second molar. *b*. Degenerate but usual form of quadri-cuspid type of lower second molar in higher races.

spear-shape. The tribes of Chihuahua had cuspids that were rather large and spear-shaped, very few conical crowns being found among them.

The lower cuspids were generally of the ordinary conical type, flattened on the mesial side or less flaring on the distal (Fig. 3). The Tlatelolcos had rather full distal prominences and frequent lingual ridges. The latter feature was very marked. The cusps were high and sharp where not worn. One or two were of marked reduction in size, like small conical supernumeraries. The strictly conical form was of course most usual. Among the Tarascans these teeth were mainly of conical form, and ranged from small to large. A few were wide at the distal with an approach to the spear-form. The great majority, however, were of decided conical shape, with a sharp point when not worn. Of those from Jalisco, while the ordinary type predominated, there were many with a flat face, flaring borders and an approach to the spear-shape. Those of the

Xico, Teotohuacan, Zapotec and the tribes of Chihuahua were decidedly conical. A very few indicated an approach to the spear-shape of the upper cuspid.

Bicuspids. Coming to these teeth we find the most interesting and unique feature to be observed among the Mexicans in regard to the ethnic characters of the teeth, namely, the *excessive smallness* of the bicuspids. These teeth are nearly all below the average size, in comparison with the other members of the same denture in Europeans. Usually they are extremely small, deficient in development, sometimes deformed, and even peg-shaped. So far as my observation and information goes this feature is unique with the Mexicans. Dental practitioners in Mexico assured me that it prevailed with the living Mexicans also. A more extended study of the ethnic characters of other peoples of all parts of the world might disclose others who have this feature also. Of course some other American Indians probably have it to a degree, as has been noted of the Peruvians (op. cit.), but the Mexicans so far exhibit the most marked manifestations of this interesting characteristic. It seems to be ethnic. As remarked before, this excessively small size of the bicuspid seems to militate against the Mongolian theory of the origin of the American aborigines, for the Mongoloid peoples of Asia all have, so far as noted, very large bicuspids as compared with the other teeth of the same denture. Further study may yet disclose an Asiatic or Polynesian race who have small bicuspids, and this discovery would assist materially in tracing the origin of the American people. Thus a definite value would be placed upon the science of ethnographic odontography, as on other stomatological studies that have an acknowledged ethnic and diagnostic value. This is one of the objects of the elaborate prosecution of these investigations.

The first upper bicuspids among the Aztecs and Tlatelolcos ranged from small to medium; a few were good sized, with the marked features that the prevalent outline of the buccal cone was very wide mesio-distally, and the lingual cone very narrow (Fig. 4). Square or oval crowns were rare. In those of the Mexican valley this type also prevailed, and among them some of the very small crowns were found. Bifurcation of the root was the prevailing type and an occasional three-rooted specimen occurred. Among the Tarascans this tooth was small—some very small—with the usual wide buccal cone and the narrow lingual. A very few were flat or oval

in outline, but flatness from interstitial wear was notably absent. The prevalence of the very small crown with poorly developed features was impressive. In those from Jalisco the crowns were from medium to small, with the wide buccal cone and narrow lingual. A few were flat or oval. The Otomies were the same. In those from Xico were found many of the very small type, as well as among those from St. Simon and Teotohuacan. From Chihuahua they were generally small to medium.

The second upper bicuspid presented a larger percentage of very small crowns. Among the Aztecs and Tlatelolcos the prevailing type was very small with oval outline. A few had the wide buccal cone with narrow lingual, which were larger. From St. Simon and the Mexican valley they were quite small, with the wide buccal and narrow lingual outline. Among the Tarascans the types ranged from small to very small, with the wide buccal and narrow lingual outline. A few were medium and oval. The small type was quite prominent, some being smaller than the first bicuspids beside them, and a few were even peg-shaped. Those from Jalisco ranged from small to medium. The collection of miscellaneous tribes was about the same, with some very small examples. In Xico they ranged from very small to medium, with oval outlines. The Chihuahua tribes were about the same.

It should be observed that a more extensive survey should be made, with the arrangement of the observations in a statistical order. The unique feature of the excessive smallness of the bicuspids of the Mexicans could then be more fully brought out, but my limited material in some directions was not sufficient to make statistical tables impressive.

The lower bicuspids presented the same remarkable feature of smallness in size, and sometimes they were diminutive. They averaged smaller than the uppers. The usual special features of the occlusal faces of the two lower bicuspids were reduced and indistinct. In fact, many of them were quite like undeveloped and imperfect teeth. The remarkable reduction of size and functional form had a more degenerating effect upon them than upon the upper bicuspids.

The first lower bicuspids among the Mexican city and valley people and the Aztecs and Tlatelolcos ranged from medium to small, the majority being very small. Those occurring most frequently

were the very small and deficient crowns, and of these there were many. Only a few were full size, and large crowns were very rare. The buccal face was not full and bulging, as is normal with this tooth, with the buccal cusp leaning lingually. Like other features, this was deficient. The lingual cusp varied greatly as to height, as might be expected with the degenerate type of the bicuspids (Fig. 5). The lower third position was that of most frequent occurrence, and next was the second position. Very few had the first position—the full, simple bicuspids. A good number were the fourth position, which is a very primitive type, recalling the low cingule of the insectivora and the lower quadrumana. (See Peruvians, op. cit.) The curious insectivorous reversion of the disto-lingual projection also occurred sometimes. The crown was not inclined to be flaring and inverted-bell shaped, as in the normal, full type of this tooth, but owing to deficiency of development was more of a cylindrical form.

Among the Tarascans the great majority of these teeth ranged as very small. This showing among these people was remarkable, as these teeth were almost universally very small and cylindrical. A great many were mere peg-shapes. There was very little buccal bulging, owing to the great degeneracy of the crown. The position of the lingual cusp was apparently about equally divided between the second and third. Some were fourth and a very few were first. The disto-lingual projection was common. Sometimes a groove cut across the transverse ridge so that the occlusal face had the appearance of the second bicuspids. Rarely was there a groove over the lingual marginal ridge.

Those from Jalisco ranged from small to medium, with not so many of the very small crowns as in other tribes. There was a predominance of the second position of the lingual cusp, with some first position. The buccal bulge was well marked, so that the crowns here were not so degenerate. Those from Xico, Teotohuacan, etc., were much the same. The Zapotecs had these teeth very small, with the lingual cusp in third position. The Chihuahua tribes had them ranging from small to very small—the latter predominated—a very few with the buccal bulging, and the lingual cusp in the second and third position. In a few of the very small crowns it was in the first position, reproducing the form of the upper bicuspid on a small scale.

The second lower bicuspids, as might be expected also, owing to the degeneration of the bicuspid series, presented a very incomplete and deficient development of the occlusal features. For the same reason they were small in the crown and not as flaring at the marginal line as is usual with this tooth when normally developed. The general degradation of form was very apparent and detracted from the possibility of analysis which makes these teeth so interesting in the study of the evolution of races. For instance, we find that in the higher races, as the Europeans, the tricuspid type of second lower bicuspid is most prevalent, and that as we descend in the evolutionary scale it assumes lower types, such as the lingual crescent or cross-ridge forms (Fig. 6). Hence we come to regard the tricuspid type as signifying an advanced stage of evolution of the race. With the Mexicans, however, the general degradation of these teeth, and their incomplete development, interfered to a degree with any attempt at such an analysis. The lower types of occlusal face prevailed, of course, owing to this imperfect development, and the tricuspid form was rare.

Among the Aztecs and Tlatelolcos of Mexico City the lower second bicuspids ranged from small to very small. There were a few medium and a very few large crowns, but the most were small and the proportion of very small and peg-shaped was larger than that obtained with the other bicuspids. This excessive smallness is one of the wonders of Mexican odontography. The occlusal features were mainly of the lingual crescent and cross-ridge type. A few were like the first bicuspids, with some variations in the height of the lingual cusp, and a very few were of distinct upper bicuspid forms. A proportion were of the higher tricuspid form, but these were greatly in the minority, perhaps one in five. With the better development of the bicuspids in general it is likely that the tricuspid form would have been more in evidence, but the general degeneracy operated to the obliteration of this higher type. From St. Simon and the Mexican valley the proportions were about the same of the various types.

Among the Tarascans the development of these teeth was a little better, the crowns ranging in size from medium to small, with a few normal. The proportion of the tricuspid type was not large. The lingual crescent and cross-ridge types were largely in the majority. The number of the type similar to the first bicuspids was

noticeably large. The general forms were very degenerate, there being more of the modified crescent than any other. Those from Jalisco, Xico, Teotohuacan, Zapotec, etc., had these teeth very small, with a considerable proportion of tricuspid type, the crescent form prevailing, however. A few were pure bicuspids. Those from the miscellaneous tribes of Chihuahua were very variable, of course, but the teeth were as a rule very small and of low type, the tricuspid form being most rare. The type of the first bicuspid was also noted. There were not enough of any one type in any one tribe to form any estimate.

The molar series presented some very interesting features, and they were remarkably variable—as much or more so than an equal number of Europeans. The various elements of the crown were reduced or enlarged with surprising irregularity, so as to make an average type quite impossible. This variability might have been due to collateral degeneracy of the entire molar series, which is especially manifested in the bicuspids. The varied outline of the crowns was caused by the great variability of its developmental elements, the cones and cusps. The cusps were usually low and smooth, and were high and sharp only on a few well developed first molars. The flaring crown was not common, but the vertical form was more frequently cylindrical.

The upper first molars were generally better developed and preserved the integrity of form much better than the second molars, which are notoriously variable in all races. Among the Aztecs of Mexico City they were rather large and square, with the four elements—the four cones—well defined (Fig. 7). Among the Tlatelolcos this tooth was large, but there was much reduction of the metacone (the disto-buccal cusp) and occasionally of the hypocone (disto-lingual cusp). In a few there was a decided trapezoidal form, due to the reduction of both the metacone and hypocone, the two distal elements. The reduction of the metacone was very marked, amounting almost to a distinguishing feature. The full square form was quite the exception among the Tlatelolcos, so frequently was the metacone reduced. Another rare form was the partial diamond, in which the protocone (mesio-lingual cusp) and the metacone were reduced and the opposite cones were enlarged. The reduction of the hypocone alone, which is usual with the second molar, was uncommon with the first. Indeed, the metacone was

reduced much more than the hypocone. The lingual groove running down upon the lingual root was of occasional occurrence, but there was not much frequency of this simian feature. Rarely the entire occlusal face was wrinkled almost to the obliteration of the cusps. This is a very low, Orang type and is not uncommon in human third molars, but is rare in the second and very rare in the first. The roots were of the usual divergent form in the square crowns, but with the deficient crowns they were disposed to be coalescent and conical. There was a collateral degeneracy of the cusps and roots, of course. With the other tribes of the Mexican valley the upper first molar was generally medium square, with the peculiar feature of the metacone being reduced. Occasionally the trapezoid form was presented, in which the metacone and hypocone were reduced. The diamond form occurred also.

Among the Tarascans this tooth was rather smaller and irregularity of form was common. The irregular trapezoid was frequent, either by the reduction of both distal cusps (the metacone and hypocone), or both buccal cusps (paracone, mesio-buccal, and metacone), or both mesial cusps (the paracone and protocone). This irregular trapezoid type by the reduction of pairs of cusps was quite remarkable. This peculiarity was also noticed among the Peruvians (op. cit.). The diamond shape was usually produced by the reduction of the protocone and metacone and the enlargement of the hypocone. The main feature, however, was the reduction of the metacone, which was almost universal. The lingual groove was common. Those from Jalisco, Otomie, Teotohuacan, St. Simon, Zapotec, Chihuahua, etc., were usually large and square, with the metacone reduced as usual. There were occasional trapezoidal and diamond shapes similar to those found in the previous lists. Irregular trapezoidal forms from the reduction of different pairs of cusps were not uncommon. Flaring crowns were more frequent in those of Xico. The diamond prevailed to some extent—even the compressed diamond as it occurs with the second molars. With the first molars this cannot be considered as a normal type, however. The lingual groove was frequently present.

The general type of the upper first molar—the large square crown with the metacone reduced, or the trapezoidal form with both distal cones reduced—was most common with all the Mexicans examined.

The upper second molars were, as was to be expected, very de-

ficient in the Mexicans, who exhibit so many of the stigmata of degeneracy. It varied from the full, large, square, first-molar pattern to that of the lemurine tricuspid type, the lobe of the hypocone being usually suppressed in the second molar, and the protocone enlarged to more or less embrace the entire lingual face—except in the very square form (Fig. 8).

Among the Aztecs and Tlatelolcos there was great variety of the second molar. The form with full hypocone was not uncommon, but generally the latter presented all degrees of variation, from full size to total absence. Total absence of the hypocone, and the consequent tricuspid form of the crown, were common. The trapezoid form was not uncommon where the distal cones were systematically reduced, although the metacone was not diminished so frequently as in the first. As is usual in the second molar, the reducing force was mainly centered on the hypocone. The protocone was nearly always full over the entire lingual face. The diamond form occurred, but from the reduction of the hypocone and paracone, and not of the opposite cones, as usually takes place in the first molars. The deformed, compressed diamond occurred also. The roots were usually fused to the connate form, especially when the crown was reduced, but were divergent like the first when the crown was square. In fact, all the varieties of the second molar that are so well known among Europeans occurred with quite as much frequency among the Tlatelolcos. In those from St. Simon and the Mexican valley the tricuspid and trapezoid forms occurred with most frequency. The square form was rare.

Among the Tarascans it was in general of tricuspid form, with the hypocone much reduced or absent. The trapezoid form came next. A diamond form with the paracone much enlarged was found. The metacone was reduced with unusual frequency for this tooth. The crown was rarely square, with all the features of the first, including the slight reduction of the metacone. A large tricuspid form was a variety in which the hypocone was absent and the entire trigon enlarged. A very few cingules on the protocone were found, which is unusual in the second molar. The prevalence of the tricuspid form with the trigon (the three primitive cones) alone preserved was remarkable. A larger percentage could not be found even in the Latin races of Europe, who present this lemurine feature so constantly. Among those from Tabasco there was

about the same proportion of tricuspid second molars, with the hypocone absent, and of the trapezoid form, with the hypocone and metacone reduced, as with the Tlatelolcos. There were not perhaps so many of the full square form. A rarity was an enlarged metacone. The Otomies and others were about the same. Among those from Xico there was an unusual proportion of diamond and oval shapes. Those from Teotohuacan, Zapotec, etc., had the same proportion of tricuspid and trapezoid forms. Among the miscellaneous tribes of Chihuahua the tricuspid type prevailed, with some trapezoid and a very few large and square crowns.

The tricuspid form of the second molar was thus most prominent among the tribes of Mexicans examined, and this tooth presented more deformity than among an equal number of Europeans, unless it should be those of the Latin race. Prof. Cope some years ago called attention to the lemurine tricuspid form of the upper molars of the Latin races.

The lower first molars were usually large and square, for it is the one member of the entire human series that is most constant and exhibits the fewest signs of degeneracy or reversion. It usually had the five cones and cusps well developed and the crown flaring, i. e., wider at the marginal ridges than at the neck. As this tooth maintains the purity of its primitive type, there were a few of the extreme simian form in which the crown was elongated distally. The absence of the fifth tubercle was unknown among those examined, and the only variability it presented was its position, as to whether it was on the buccal line or was moved back onto the distal marginal ridge. This slight change modified the shape of the crown somewhat, and there was some variation also as to the size of the triangular ridges of the cusps and the consequent extent of the occlusal fossa. As a rule this was wide and well marked, as the cusps and tubercles of the teeth were unusually low and undeveloped in all of the teeth of the Mexicans. The only irregularity that occurred was the division of the metacone (mesiolingual cusp) by a groove into two points, making a six-cusped tooth. This can hardly be considered as normal, however. The roots were generally normal as the crowns were usually so. Taken altogether, the first lower molar among the Mexicans was a well developed and functional tooth.

Among the Aztecs and Mexican valley tribes this tooth was

usually large, square and flaring. Among the Tlatelolcos it was also large and flaring with large fossa, but there were also some small crowns. A few divided roots were observed, which is not an unusual reversion in this tooth. A few with wrinkled occlusal faces were found among the Tlatelolcos and Aztecs. Among the Tarascans it was large and medium and square, with all the features perfect to a degree. Quite a number flared at the back especially, which would indicate an unusual retention of simian perfection. The wide fossa prevailed and a few were wrinkled. In those from Jalisco it ranged very large, with all the features well marked, and flaring distal borders. Those from Xico, Teotohuacan, Zapotec, etc., were much the same—large, square and perfect as to detail. From the tribes of Chihuahua they ranged from large to medium, with the details well developed.

The second lower molar was quite in contrast to the first, for it presented as many of the signs of degeneracy as are common to this tooth among Europeans and other higher races (as I have noted elsewhere—see Trans. Internat. Dental Congress, Paris, 1900—Fig. 9). Among the Mexicans it was quite degenerate, showing generally the quadrituberculate form, with only an occasional reversion to the five-cusped type of perfection, which is simian. The form of the crown depended upon the number of cusps or cones, i. e., with the five-cusped form it was flaring like the first, and with four it was more cylindrical.

Among the Aztecs and Tlatelolcos it ranged from small to medium in size, with quite a number of large ones with five tubercles. The roots were connate in the four-cusped type and divergent in the five, which was like the first molar, of course. The cusps were generally well developed, with large triangular ridges, and the wide fossa only in the five-cusped type. In the Mexican valley there was more of a prevalence of the four-cusped type with medium crown. Among the Tarascans there was a much larger percentage of the five-cusped crown, although the quadritubercular predominated. The tooth was apparently not of as degenerate organization as with the other tribes examined. An unusual number were of the primitive quinquitubercular type, with the distal projection and very wide fossa. Some were wrinkled. All these signs of perfection of this tooth would imply a more primitive organization for the Tarascans. Those from Jalisco exhibited a less proportion of the fifth tubercle

and more of the quadritubercular form. In those from Xico, Teotohuacan, etc., there was a less proportion of the fifth tubercle. In the Chihuahua there were more of the four tubercles.

Taken altogether, the second lower molar was very variable among the Mexicans—almost the same, except the Tarascans, as it is found among Europeans, who also differ as to the tribes and nations of Europe.

The third molars were very degenerate—quite as much so as with Europeans—and the same types of variety and eccentricity of form were found among the Mexicans. A few normal crowns were observed in which the types of the preceding molars in the same jaw were reproduced, but these were in the great minority. The majority were reduced, malformed or absent.

The upper third molars were as usual more reduced than the lowers. This is common among Europeans. The tricuspid and bicuspid forms were frequent. Various irregular trapezoidal forms were found, as also the mere peg-shaped. Total suppression was common, and encapsulation in the bone not infrequent. Among the Aztecs and Tlatelolcos this tooth was very much reduced, with all varieties of the trapezoid, tricuspid and bicuspid crowns—the last two predominating. There were but one or two full-type upper molars found among them. Such a record of degeneracy surpasses even the Europeans. As a consequence the roots were connate, and none divergent except in the full crowns. A very few were wrinkled. Many were not erupted, but whether totally suppressed or not could not be made out. Fourth molars were fused to a few, as in some diamond shapes, or in buccally distended crowns with supernumerary cusps.

In the Mexican valley tribes these teeth were usually small and tricuspid. Some were bicuspid, and rarely were they of full type. Among the Tarascans there were a very few of full type like the first molar. There were many of tricuspid form, with some bicuspid and trapezoid with four small cusps. Quite a number were wrinkled, with partial obliteration of the cusp pattern. Some were suppressed or perhaps only contained in the jaw. From Jalisco they were small and tricuspid or trapezoidal, with an unusual proportion unerupted. From Xico, Teotohuacan, Zapotec, etc., they were tricuspid, trapezoid and wrinkled. The miscellaneous tribes

of Chihuahua were mainly trapezoid, with some wrinkled and bicuspid.

The lower third molars were not quite so reduced as the uppers and not so erratic as to form. They frequently reproduced the quinquicuspid lower molar type, but the majority were four-cusped like the second, or with four or five cusps irregularly arranged. Quite a number were of the wrinkled, orang type, not infrequent in lower third molars. Some few had the extra number of cusps indicating the addition of supernumerary or fourth molars. There was as much irregularity of eruption, impaction, deflection outwards, etc., as with Europeans.

Among the Aztecs and Tlatelolcos the full five-cusped form was not uncommon, although the four-cusped or four or five irregular forms were in the majority. The crowns were usually full and not so deficient as were the uppers. A few were wrinkled. The roots were of the same irregular form, connate and turned backward as a rule. In the Mexican valley they were of much the same type. Among the Tarascans this tooth varied from full type to four cusps or wrinkled, being unusually well developed. There were a large number of full size. The four and five cusped were often irregular in outline. There were a number of impactions and displacements toward the cheek. Those from Jalisco, Xico, etc., were about in the same proportion. There were a number of wrinkled crowns among the latter. The other tribes were about the same—some full type but more often irregular four or five cusps.

The third molars of the Mexicans thus exhibit a degree of degeneracy that is surprising, when we consider the scale of their cultural elevation. The frequency of degeneracy is quite as great as among a similar number of Europeans.

In conclusion, I will not attempt to draw any deductions from the data herewith presented, except such as have been incidentally made in the course of the paper. The data are insufficient from which to make generalizations. The most that I can claim is to hope that these studies may incite others who may have opportunity to make further observations, to the end that in time a scientific odontography of this most interesting group of people may be made out. In this, as in others of my investigations of the subject of ethnographic odontography, I am but blazing the way for future scientific work.

WHAT POSITION DOES THE PROSTHETIST HOLD IN THE PROFESSION OF DENTISTRY?

BY. F. H. BERRY, D.D.S., MILWAUKEE, WIS. READ BEFORE THE NATIONAL DENTAL ASSOCIATION, AT ASHEVILLE, N. C., JULY 28-31, 1903.

Twenty years or more ago the profession was divided into two branches, which were known as operative and mechanical dentistry. The operative class of men seemed to frown upon the mechanical branch as being the laborious, dirty and unscientific part of the profession, a part which needed but little or no dental education, aside from possessing the gift of natural mechanical skill. It was then the universal belief that the mechanic need not know anything about anatomy, physiology, chemistry, or in fact any of the scientific branches. The students in the colleges and even the teachers naturally leaned toward the operative department as being the backbone of the profession. The tendency, both in argument and in journal literature, was to elevate dentistry to the plane of medicine, even creating a strife to gain recognition as a specialty of medicine.

Later on, as the mechanical man began to grow, due to his own mechanical skill and inventive genius, the operative men began to envy his position, but their dignity would not allow them to join the ranks under the name of mechanical dentists, so came about a change of name from mechanical dentists to prosthetic dentists or prosthetists. Then for years the non-mechanics, clothed in the name of prosthetists, tried to practice the mechanical art, but like the girl who aspires to be a star opera singer, but whose voice is not adapted to the part, and who soon drifts back to her true vocal worth, that of a chorus singer, so the would-be prosthetists of bygone days gradually drifted back to operative work. However, after their eyes had been opened so as to enable them to see the larger field of dentistry afforded by prosthesis they were not content to go back and confine themselves to the smaller field provided by operative work alone. For this reason came about the custom of doing part of the process, and sending that portion which required skill to a kind obliging neighbor, who was satisfied to rank as a mechanic, and who felt a pride in helping his less skillful colleague and in convincing him that prosthesis was not so easy.

Due to this practice soon came about another branch. To-day it

is known as the mechanical or manufacturing laboratory. This division brought about another condition. When the mechanical laboratory was born a few of them were operated by prosthetic dentists, who had made prosthesis a life study—such men, for instance, as Dr. Haskell, the late Dr. Bonwill, and a number of others. In those days prosthesis and the mechanical art were practiced together, but now in later years the dental laboratories are operated in some instances by the highest class of purely mechanical dentists.

I am sorry to say, however, that not many of these men profess to know anything about prosthesis. They receive from their customers an impression or model, with more or less data regarding color or size of teeth, and construct thereon a high grade of mechanical work, such as a crown, a denture, or a piece of bridgework, without so much as ever seeing the patient, and without giving the work a thought from the prosthetic standpoint. What is the result of this division? It has driven much of that which rightly belongs to dentistry into advertising offices, where the work is being done by the mechanic and not the prosthetist. The consequence is that many of our patients, not being able to discriminate between the two classes, are led to believe that it is not necessary to pay even moderate prices for crown and bridgework and artificial dentures, when they can save so much money by going elsewhere. The only value they put on such a piece of work is estimated by the number of years it will last, and whether the process of construction *hurts* or not.

This feature may seem to be degrading to our dental profession, and it perhaps was so for a time, but on the other hand it has created or stimulated a higher appreciation of true prosthetic work, both among the public and the profession itself. To-day most of our colleges are teaching prosthesis in its highest sense, while a few years ago the teachers' efforts were given almost entirely to technic laboratory training, and the construction of all kinds of appliances, without reference to patient or surrounding parts.

It has been asserted by one of the best prosthetic men in the country, that prosthesis cannot be taught or acquired. It must be inborn as is a talent for music or painting. I disagree with him on this point. It would be very discouraging indeed to think that it is not possible to learn dentistry unless it is born in us. I say dentistry, because it is my belief that nine-tenths of dentistry as prac-

ticed to-day is prosthetic. What is porcelain filling, for instance? After you have exerted your knowledge of dental anatomy in preparing a cavity, is not all the remaining process mechanical or prosthetic, even to the cementing in of the finished filling?

In other words, if a dentist is not a good mechanic can he put in a good contour filling, can he construct a good crown or bridge, can he intelligently decide which teeth or roots will serve the best purpose for abutments of a bridge? He needs to know something of the results of strain or stress on the parts in question before he can intelligently decide what class of appliances is best suited for the case in hand. So I say that if to-day we ignore all that is prosthetic and mechanical in dentistry there will be left only a small bundle of that which we may expect to derive from the profession of medicine. How then can we ever expect to look upon dentistry as a specialty of medicine? Dentistry is an art and science by itself, distinct from all others, but compounded out of many arts, trades and sciences. Dentistry is prosthesis and prosthesis is the highest order of dental mechanics. Perhaps the best definition for prosthesis is the art of restoring lost organs and tissues by artificial ones.

Perhaps you will contend that I do not make any distinction between true art and science, that is, in the sense of art being the ability to do a thing and science the knowing what to do. I do not see that it is possible to make this classification or division in dentistry. A man may be an artist, as are many of the workers in our mechanical laboratories, but I cannot see that he can practice the science without being an artist. He must know how to do before he can decide what to do. The result of prosthesis is science and art going hand in hand, and the separation of these two divides the dental profession from the mechanical laboratory. Knowing then the advance stage at which the dental profession has arrived, do you not think it folly to assert that this branch cannot be learned or acquired without possessing the inborn quality which goes to make the artist in our profession?

Prosthesis is being taught and is being practiced by many of the brightest men in our profession. It is being recognized by both the public and the profession, and both are learning to look for a higher class of attainment than is displayed by a mere piece of mechanical structure. To-day the quality which goes to make a

good prosthetist is envied by our less skillful brothers. Instead of being the frowned down, dirty branch of our profession, it is to-day being looked up to as the essence, the very cream, of the art of dentistry. It is one of the live wires of American dentistry. It is that which makes the foreigner look up to American dentists as being the best on earth. It is the prosthetic technic course of our colleges which attracts the foreigners to our schools. If they wanted simply the medical specialty feature of dentistry they could perhaps do as well or better at home. The American is praised the world over for his mechanical ingenuity, and so American dentistry is built upon the same rock foundation—*mechanical ingenuity.* How can we then but contend and believe that prosthesis is American dentistry?

We must get it out of our heads that in order to be professional men we must be a near kin to the medical men. The men who think, contrive, manipulate, and educate mechanical skill in themselves are the true dentists of to-day, and in my estimation they are the men who are building and who will build up the grand profession of dentistry to a point equal to but not a part of medicine.

WHY STAND YE IDLE?

BY C. W. MEGUIAR, D.D.S., MUNFORDVILLE, KY. READ BEFORE THE KENTUCKY STATE DENTAL ASSOCIATION, AT BOWLING GREEN, MAY 25-27, 1903.

Allow me to briefly draw a moving picture, with nature for a background, illustrative of certain conditions. There on a gentle sloping landscape, terminating in a bluff, at the left and well to the front looms out a portion of a noble forest. The stately beech and the spreading oak lock arms and cast cooling shadows where out from the depths and into the light of the rising sun flashes the spray of a murmuring brook as it dances along over pebble and stone, bathing its mossy banks in a silvery sheen. Is it not like unto a fount of knowledge springing from a tower of truth? Then, reflect ye, what a weapon is truth and how like a two-edged sword it cleaves the way.

Just beyond the winding brook observe that field of maize with its hundreds of long, shaded avenues, down through the fleeting

vistas of which can be seen the evidence of a sturdy hand turning the soil to the leaping stalks. See the waving arms and the green swaying forms. Is not that a thrifty throng? Do we not find enthusiasm there?

Now appears a scene that ever hath a charm—a field of wheat in its cloth of green, acres and acres of precious grain. Every majestic head is on a level, with no advantage over its neighbor; each tiny stem erect and self-reliant. When kissed by the sun, a charming example of peace and industry; when caressed by the breeze, a matchless imitator of the rippling waters of gulf and bay; when bathed by the rain, gladly submissive and joyful still. But see it now, tossed by wind and storm—what a grand mimic of marching hosts mustering for united defense! Watch the legions advance and retreat. See a battalion go down, then rise again and charge! How irresistible it seems to be. But how think you it would be if each slender stalk stood apart and alone? Think you, my friends, that a host of us standing together for the cause of honesty and in the interest of humanity could not rout an enemy, abolish a common nuisance?

Here the merry brook changes its course and flanks the passing scene, disappearing in the distance as the next and final view is presented. This is a tobacco field, a small body of sloping land called "new ground," from the fact that it has recently been cleared of all the standing timber. It appears to be very rich and full of the strength so essential to the production of good tobacco, and every "hill" has a thrifty young plant to nourish and strengthen, but the eye cannot dwell upon this field as upon the field of grain, for there is no harmonious blending of a kind. Stumps, big and little, stupid sentinels standing in disorder and necessitating crooked rows, present a scene of discord that is not restful to the eye. Don't you think that the judicious use of a little dynamite at the base of those ugly sentries would be a timely and wholesome proceeding?

It occurs to me that there is such a thing as a stump in the dental professional field, and upon reflection, that there is quite a number of them—big and little—also entangling roots and vines beneath the surface. There is the big stump occupying soil that might be cultivated to advantage, but doing no particular harm except by example. It is typical of that city fellow with a wealthy patronage and high social entree, who is too busy with such matters to take

an interest in the state society and his profession's advancement. It is also like the rural dentist who, ethical and conscientious, has a full practice, so full that he can spare no time for the society which was a factor in making that practice possible. This man is simply filling a void, occupying space, selfishly gathering spoils unto himself alone, and a poor example for others. Among this crowd of absentees is sometimes found a fellow who attended the meetings and took an interest so long as official honors were conferred upon him, but when they failed, he quit, and we knew him no more. The little stump is symbolic of the dentist who does not labor all the while and would not if he could, though he wants to keep even and make ends meet somehow; but he does not care a snap if there is a state dental society or not. Of course he is not a member, and he does the profession no good and very little harm. He is simply a little stump occupying soil that might be made fruitful. He has no desire to be known outside a small community, and that desire is usually satisfied. But worse than the stumps is the tangled mass of "pesky" little roots and vines lying just beneath the surface, and extracting from the soil the strength that should go to nourish the plants above. Do not associate them with the idle stumps, for they are quite busy and are in a class by themselves—they are the dregs and rubbish. They represent the pretenders, the deceivers, the blow-hards, and the liars, or, to group them under one head, the quacks. Charlatans they be, who tear down what others have builded, who mock their conscientious fellows, who revel in the blare of their own trumpets, who receive but never give, who promise but never pay; imposters, vampires, and failures!

Gentlemen, let us not have any stumps in the dental professional field in this state, and let us set about to clean out the roots and rubbish. To say that we have none would be at least charitable, and after a fashion diplomatic, but the arm of charity cannot always be stretched out as a protecting canopy, neither will conditions in certain quarters admit of exercising diplomacy. A policy of blunt directness, concisely stated, bold, searching, and fearlessly executed, will be more effective in cleaning out the dregs and rubbish than all the ignoring, head-up-in-the-air policies ever resorted to. Why, how much better condition does the quack want than to be simply ignored by conscientious men? I can scarcely imagine a policy

more inviting to this species of facultative parasite, this genus hominis decepti! Let us stop chattering about recognition from the medicos, and proceed with unrelenting determination to oust the quack from our ranks. That can be done, and when it is all the recognition desired will be forthcoming without solicitation. Do not worry about how it will be accomplished, but determine that it must be, and the ways and means will duly present themselves. Good men among us are growing tired of the abuses practiced in certain quarters, men of sufficient moral courage and determination to effectually stamp out these root-wads and parasites. When the time for action comes let no timid ones have voice in the councils, for there must be no faltering nor compromise. To imply that a fight should be made if necessary to banish quackery, or to at least throw around it a red light, a danger signal so plain that no one need err, is but to follow precedent in the establishment of sound principles of government. Kentucky is too fair a field and too chivalrous a state for its dentists to stand idle while quackery and imposition crowd the land.

Let those members of the state dental association who have been lax in their efforts and careless in manifesting an interest in its proceedings, rouse themselves to action, throw off their lethargy, and present themselves at its meetings prepared for duty. Imagine the state without an organization of any kind. We might get along very well for a short while, but would any of us have it continue so? I think not. Rather let us have a society second to none in any state, a society whose policy is fearless, vigorous and progressive, so that we may attract recognition and admiration by the mere force of action. It is no time to stand idle and await the performance of these duties by your fellows. We have no right to receive more than we give. The divine machinery of this great universe, throughout its mazes and intricacies, in all its operations, is evenly balanced to a nice adjustment, and though the pendulum may swing far out on the one hand it will go equally far on the other.

The ethical dentists of this state who are not members, and more especially the younger ones and those just entering the profession, should waste no time in connecting themselves with the state association. There is a time not far distant when the dentist who does not look well to his standing, both morally and professionally, will

find himself out in the cold. Rest assured that the strongest impression that can be made upon the people of a community, and the one which most inspires confidence, is one's interest in and affiliation with the societies of his profession. Prestige abroad commands prestige at home, and to be prominent and lasting one cannot endure without the other. The fame of no man is passive. It is active—actively increasing or actively waning. Do we claim to be professional men? If so we owe allegiance to our profession and must love its interests as our own. We must share equally the burdens and the honors, the tasks and the pleasures, remembering that in the end no one will receive more than his share of either, for that will be the reward of his labor.

EASY METHODS OF EXPERIMENTATION IN PLASTER AND VULCANITE.

BY STEWART J. SPENCE, D.D.S., CHATTANOOGA, TENN. READ BEFORE THE NATIONAL DENTAL ASSOCIATION, AT ASHEVILLE, N. C., JULY 28-31, 1903.

Plaster of Paris has three defects as respects its use in our art, namely, expansion, insufficient hardness, and contraction under heat. Perhaps I should add a fourth—warpage—but this is included under the headings of expansion, and contraction under heat, its two forms of warpage resulting from these two radical faults. The expansion of plaster as used in dentistry is threefold: 1. An expansion occurs during the act of setting or crystallizing, is accompanied by heat, and ceases in about half an hour. 2. A much smaller expansion continues during the following twenty-four hours, and is perhaps due to absorption of something in the atmosphere. 3. Another expansion occurs during vulcanization, and is caused by steam, being absent when vulcanization is done by dry heat.

An easy method of experimentation by which you can verify the first-mentioned expansion is to fill an upper impression tray with a mix of plaster. When setting has occurred you will be able to see easily with the naked eye a space between the tray and the plaster, amounting usually to about twelve folds of No. 20 tinfoil. The space is frequently not apparent until the cast is removed from the

tray and then replaced, because the effort of the plaster to expand lineally has enough force to slightly bend outward the buccal flanges of the tray. The flanges, however, offer increasing resistance and check this linear expansion, on which the plaster, in its effort to further expand, bows upward, so warping. Doubtless some expansion is prevented by the resistance of the flanges, for if plaster is sufficiently confined—by being poured into a cannon ball, for instance—no expansion can occur, the molecules being compelled to remain more closely together during and after the rapid movements in crystallization than they do where they have room to spread out.

An easy way by which you may verify this assertion, that bowing up occurs when linear expansion is restricted, is to tack down on your bench two little strips of lath about a foot apart, and pour a strip of plaster between them. When setting has taken place you will find that the plaster strip has bowed up at its center. Next pour a similar strip of plaster on the bench with its ends free to expand, and you will find that no bulging occurs.

As a third experiment, and to verify the assertion that expansion occurs during vulcanization, take the cast which you poured in the impression tray and run it through the vulcanizer. On attempting to replace it on the tray after this ordeal you will observe a great increase of expansion, so much that now fully twenty-four folds of No. 20 tinfoil will pass readily into the space between tray and cast at the palatal dome. Here let me interject a caution—cool the vulcanizer slowly during this last experiment, because rapid cooling tends to cause a plaster cast to explode and thus unfits it to return to the tray. This fact should be remembered by those who use plaster for investments in vulcanizing, especially if used green (newly set), because this breaking up of the plaster will permit a greater shrinkage of the vulcanite in cooling than would otherwise occur.

Let us pass on to the subject of insufficient hardness of plaster casts. Because of this defect they compress during flask-closing, even with rubber, and much more so with celluloid. They act similarly in swaging with shot, and also permit contraction of the vulcanite plate in cooling. To easily test this first assertion, fill the lower half of the flask flush with plaster, soap the surface, and fill the upper half. When set open flask and place between the halves fifteen or twenty grains of red rubber, heat in boiling water, and

screw down the flask. Now, as there was previously no space between the two plasters it is evident that if the plaster is not compressed by the rubber nearly every particle of the latter will be squeezed out at the edges of the flask. As a matter of fact, the opposite will result, and probably none of it will find its way out, as it will force a bed for itself in the plaster. The explanation of this fact is that the soft rubber under compression by the plaster becomes no longer soft but hard, and thus reacts on the latter. Furthermore, my experiments show that where rubber is unevenly packed the compression of the model will be correspondingly uneven.

Another evil arising from the softness of plaster is that the teeth are displaced by being forced into the investment, notably in celluloid work. This is the chief cause of dark joints in sectional gum dentures, the blocks being driven into the plaster in flask-closing, thus spreading their joints. The insufficient hardness of plaster is again exemplified by the fact that it suffers so much during vulcanization as to be unable to control or prevent the effort of vulcanite to contract in cooling.

That vulcanite contracts in cooling can be readily verified as follows—take the flask last mentioned, which you remember was filled with plaster, and cut in the plaster a little groove reaching nearly across the flask, into which vulcanize a strip of rubber. Then remove this strip from the flask and trim it down until it reaches exactly across the lid of one of the little metal boxes in which rubber and wax come to us. Now immerse the strip for a minute in water heated to 130 degrees, F., placing also thermometer in the water. On taking out the strip, chilling and replacing it in the lid you will probably observe no perceptible change, but repeat this operation at 140 degrees and a slight contraction will clearly appear—about one sheet of thick note paper. At 150 degrees, 160 degrees, and 170 degrees the contraction will increase at about the same rate or rather more, and at 212 degrees the shrinkage will amount to about 1.0 mm.

Let me digress to say that I have cause to believe most misfitting plates are too large, and that they may be made to fit much better by being thus contracted in warm weather. There is no danger of warping them in this process, as vulcanite contraction proceeds evenly when it is free to move. When a plate is warped it is because the plaster investment holds one side of the plate more firmly

than the other, thus throwing the burden of contraction on the side held more loosely.

The third defect of plaster is its great contraction under heat, which interests especially the metal plate and large bridge worker. To test this simply and easily, fill with plaster one of the metal lids mentioned, remove the cast from the lid, and stand it upright on one end over a fire. If necessary to support it in this position it may be placed in a metal pot filled with sand. After being thoroughly heated it will be found on replacement of the metal lid much more contracted at the end that was more heated. If, on the other hand, this cast instead of being placed as described had been laid flat over a flame which would reach only its central portion, this portion would undergo the contraction and in so doing would probably warp out of the original shape. To prevent both of these evils the plaster should be liberally mixed with some other substance. Heat passes very slowly through plaster, but when it is mixed with something else, such as marble dust, the cast is made much more soft and porous, thus being more permeable by air and consequently a much better conductor of heat. The heat being thus more evenly disseminated, unequal contraction does not occur to so great a degree or indeed any contraction. Such porous casts have the further advantage that they can be heated soon after being poured, water escaping from them readily. My experiments in this line are not yet completed, but I have demonstrated by many tests that an investment which is meant to be heated to incandescence should not have more than 25 per cent of plaster—that is, if the contraction of the investment is to be considered. Unfortunately an investment of so small a percentage of plaster is very soft, and should it fall during soldering it is almost certain to break into pieces. Thus we are between Scylla and Charybdis with the soldering investment question—an excess of plaster causes contraction, while a minimum causes softness.

I would suggest that for easily testing the contraction of investment compounds you use the lower half of a Whitney flask, placing it filled with the investment to be tested over the fire until incandescent. You will perhaps be surprised to then find that this will cause a space of two or three millimeters between the flask and shrunken investment, even with some of the most extensively sold investment compounds.

However, while our profession is, I think, as yet without an ideal investment for soldering, the outlook is more cheerful in the case of plasters for plate work. During the past year your essayist has been using with satisfaction a non-expanding plaster for impressions and a non-expanding, hard-setting plaster for models, investments, etc. The latter being about fourfold harder than plaster of Paris maintains the integrity of its form in flask-closing, and remains sufficiently firm under the ordeal of vulcanization to came out about tenfold harder than similarly vulcanized plaster of Paris, thus preventing all effort of the cooling vulcanite to lapse from the shape given it by the model. A cast of this plaster poured into an impression tray will be found not only devoid of expansion after crystallization, but if passed through the vulcanizer, according to the test suggested for plaster of Paris casts, will come out unexpanded. The solidity of this plaster is not obtained by merely mixing some other substance with plaster of Paris. Excepting sand probably no substance will give density to any appreciable extent. The method by which its great hardness is obtained is very similar to that by which we get hardness and non-absorption in oxyphosphate of zinc fillings. We know that by adding the powder little by little to the liquid, and by long mixing, even up to two minutes, and finally by rolling the mass between the thumb and finger, we get a well-compressed, hard-setting pellet which will endure immersion in red ink for forty-eight hours with only a film of stain on its surface. On the other hand, a pellet of thin and slightly-mixed oxyphosphate will stain all through in that time.

A very easy method by which can be determined the relative hardness, or rather the relative resistance to compression, for this is the form of hardness most desired by the dentist, of two different kinds of plaster, is to pour one kind into one section of a vulcanizing flask and the other kind into the other section, then open the flask when the plasters have set, insert between them a steel or lead ball, and screw the flask together again. On reopening the flask you will see two depressions made by the ball, the depth of which will give the relative compressibility of the plasters. If the flask is now run through the vulcanizer a similar test with the ball will give the relative strengths of the two plasters after vulcanization, so indicating which of the two will better resist the effort of vulcanite to contract and warp in cooling.

In writing this article I have intentionally omitted all intricate and difficult methods of experimentation, suggesting only such as are, while correct in their results, very easily performed, and which require no instruments other than those which every dentist has in his office.

PORCELAIN INLAYS.

BY G. B. MITCHELL, D.D.S., ROCHESTER, N. Y. READ BEFORE THE ROCHESTER DENTAL SOCIETY.

With the utmost conservatism and veracity it may be said that the dental profession, in comparison with the others which preserve the human form in its entirety, has made the most rapid strides in development. Among the many new methods or ideas that have been promulgated porcelain, the fin-de-siecle artistic material for operative and prosthetic procedures, has withstood the onslaughts of the profession, and will surpass our present-day conceptions. Dr. S. G. Perry has said, "We are at the beginning of a new era of great significance. The time appears to be approaching when gold fillings in front teeth will be regarded as a relic of a forgotten and barbaric age."

Porcelain inlays date back to 1820, when they were given to the profession for the first time by C. J. Linderer. Porcelain is defined by Dr. G. A. Wilson of Cleveland as "not being a chemical compound, but a mechanical mixture—a solidified suspension of two insoluble, non-fusible substances in a fusible silicate which acts as a flux or binds and holds them together." It is made from porcelain clay or kaolin, derived from feldspar rock by weathering. Feldspar and silex are added to form a fusible silicate, just enough to bind. Colors consist of various metallic oxids.

The different methods of inlay work are as follows: 1st. Obtain size of cavity by burnishing tinfoil across it, remove and trim to exact size, then paste on porcelain block and cut down. 2d. Using circular inlay burs to form a round cavity. This method at times causes too great a sacrifice of sound tooth substance. 3d. The glass inlay method of Dr. Herbst. This consists of taking impression in wax, making mould and pouring in molten glass. The result is imperfect margins and in time loss of color. 4th. Pulverize porce-

lain teeth. 5th. Burnishing gold or platinum (the invention of Dr. Wm. Rollins of Boston in 1880) matrix into exact fit of cavity and fusing the powdered body in same. Given in 1887 by Dr. Land, and which alone will be here considered.

First let us distinguish between high and low-fusing bodies. Those which will fuse in a pure gold matrix are called low-fusing, and those which will not fuse therein, but whose melting point is higher than pure gold, are classified as high-fusing. There is a great difference of opinion as to the merits of the two, and it is not universally conceded, and probably will not be for a long time, that one is better than the other. Dr. Briggs recalls two thousand Jenkins' porcelains in his practice with 1 per cent of failures—these due to hurrying cementation, grinding off glaze, or unwise shaping of cavity. Many contend that we should use high-fusing bodies only where strength is needed, as in contour work, incisal tips, etc. With high-fusing bodies you can obtain and hold contour—not raised nor warted, as in low-fusing. Stability of color, strength, and density are in favor of high-fusing. Character of low-fusing—1. Fuses below pure gold. 2. Large percentage of shrinkage. 3. Low density and strength. 4. Limited usefulness in color. Other disadvantages—shrinkage estimated from 15-33 per cent; greater liability to overbake and render porous; greater danger of changing matrix form in manipulation or fusing of same. Any porcelain which flows below 1800° contains spar, which tends to make a glassy mass. Bridging over a tear is easier in high than in low-fusing bodies. Mr. Brewster says, "Any porcelain that fuses at 2200° reaches its maximum usefulness. This range of usefulness is 1814° in low-fusing and 2200° in high." With his pyrometer gold melts below 1900,° while five other authorities range it from 1886° to 2200.°

Dr. Johnson says, "While every practitioner is entitled to his own opinion, it may be stated on general principles that if the operator wishes to invariably give his patients the best class of service he can do so only by using high-fusing bodies." On the other hand, we all know that Dr. Jenkins has done away with nearly all the gold obturation for which he was so well known, and in its stead is using low-fusing porcelain with great success. He has probably inserted more inlays than any other dental practitioner.

Dr. Savage of Worcester, Mass., has given me the following table

of results of tests with the pyrometer, to indicate the fusing point of various bodies:

110 Volts.

STEP	MIN.	DEG.	NAME AND RESULTS.
5	10	2312	White's "Y."
5	3	2300	White's.
1	1	1616	Jenkins' No. 22.
4	5	2320	Whiteley's "F."
5	1	2300	Brewster's enamel.
5	2	2300	Brewster's yellow, loses color.
5	3·5	2300	Close's.
5	4	2138	Whiteley's "F."
4	4	2138	Brewster's enamel—loses color.

The advantages of porcelain inlay work are many, and a few may be enumerated—greater comfort to patient and operator during process of work, more artistic results, economy of time, less or no recurrence of decay, on account of less porosity and higher finish. "The perfect porcelain inlay is superior to a gold filling in a considerable majority of cases in tooth-preserving qualities." Porcelain is indicated over other materials in cervical, labial and buccal cavities, in all approximal cavities where little or no force of mastication is put upon it, to rectify the results of injury or accidents, as chipping, fracture, etc. It is contraindicated in morsal and approximal cavities where heavy masticating force is present, and in lingual and palatal cavities, and wherever imperfect impressions will result.

Cardinal points in cavity preparation are—have cavity trough-shaped, its depth corresponding as nearly as possible to the size of contour to be obtained. Margins should be sharp, square, clearly defined, accurate and highly polished—never beveled. Marginal polish is obtained by using diamond, Arkansas or agate points. The cavities should be so shaped that withdrawal of the matrix without change is positive. In approximal cavities in anterior teeth cut through lingual wall far enough to show inlay at lingual face. In proximo-occlusal cavities of bicuspids and molars I often so groove the buccal and lingual walls through to the morsal surface, withdrawing matrix occlusally, as to interlock the inlay, which prevents its dislodgment by lateral strain. The deeper the cavity the better and safer the inlay. Dr. Capon attributes the failures of many inlays to the lessening of cavity depth on approaching the margins, or

general shallowness of same. In placing tips on corners of anterior teeth, where the incisal corner of tip is liable to chip, a very good plan, suggested by Dr. W. W. Bruck of Breslau, is to cut a semi-circular groove in the incisal edge, rendering chipping impossible.

Choice of matrix and procedure. For low-fusing bodies use gold foil No. 30 and No. 40; for high-fusing bodies use pure platinum, 1-1000 gauge. Point metal and introduce slowly to bottom of cavity by means of cotton, or best of all, spunk or amadou—a fungus from old tree trunks; finish margins with chamois. Keep matrix well annealed at all times. Adapt to bottom and walls before touching margins. Remove and obliterate all wrinkles. Do not burnish direct on metal, but let chamois intervene, as it tends to draw matrix away, and to a degree thins it. Always steady mass in cavity with instrument in left hand. In cavities below the gum margin bend metal on itself and introduce. This prevents the matrix being drawn into the cavity. Obtain as much of the contour of the tooth as possible, to aid in future bakings and restoration of contour. A method originated by Dr. Reeves, if matrix rocks, is to stretch rubber dam over entire matrix and burnish inside and margins, the rubber holding the matrix in place. Remove by careful teasing, and if using a gold matrix, invest in asbestos. Unless the matrix is a correct representation of the cavity and margins the inlay will never serve for tooth preservation.

Color. Always obtain the shade with the tooth wet, as drying it alters the color. Be able to see the underlying basic color, matching the shade or shades of dentin, as enamel is usually of uniform color. Learn to carry colors in your mind's eye. In labial cavities use lighter color than shade in long-lipped people, and deeper color in short-lipped. In approximal cavities use a lighter shade. These are all questions of light, reflection and darkness. If anything, considering all cavities, usually choose a lighter shade than tooth. Tobacco and other stains are to be painted on and fired last of all, except when rectifying malocclusion. Then do this before cementing, and refire to obtain desired glaze.

Mixture of body. Have porcelain body in an extremely finely divided state—"a good point of great moment." Mix thoroughly, to consistency of dough. Mix color for cervix, body and tip separately. Bake sample on absestos to ascertain that color is correct. Add the different colors at their respective places in the matrix, giv-

ing a slight tap to unite but not to mix them. Build by many layers, thus destroying the shadow problem. From basal colors, add the other necessary ones, and finish with a thin layer of Brewster's enamel XX, in high-fusing bodies. This is colorless or nearly so, allowing the underlying colors to penetrate, and yet topping all off with a beautifully finished translucency.

Fusing. While timing is by far the easiest method for operators' eyes, in view of the fact that we must give all the care possible to this work, the most accurate way is to gauge the fusing process macroscopically, using colored glasses if necessary. With gas furnaces be very careful not to "gas" the porcelain. Dry work thoroughly at edge of muffle, watch cautiously, and leave in after fusing until furnace is moderately cool, to "temper" it. Even the smallest bodies obey the law of physics, and if we disobey same by hasty removal of the piece an almost imperceptible crack may later be a monument to our ignorance and carelessness. Too rapid fusing makes porcelain porous, and too long fusing bleaches it, but the latter is advantageous at times to obtain correct shade. To make a high-fusing body low-fusing, add potassium or sodium to reduce its fusing point. Jenkins says, "Porcelain is a feminine material. It can be coaxed into going where you wish, but it cannot be driven."

Removal of matrix. Always peel matrix from margins toward center, and as soon as it has started hold in water for a moment, which facilitates removal. Small attached pieces are removed with fine burs or excavators. Though a few advise not to groove nor to remove gloss from bottom of inlay, the majority advocate cutting grooves and dovetails around and across body of inlay, which aids the adhesion of cement. For additional retention in low-fusing bodies I would recommend the following plan—file copper wire into small and not too deep square or inverted-cone shaped pieces. Place one or more as needed in bottom of matrix and fuse body over them. When finished they can be removed by boiling in nitric acid.

Cementation. Here and in all stages of the operation apply rubber dam if possible. Excavate retention in bottom of cavity rather than in margins, which weakens them. Mix cement and water and try inlaying same until proper shade is obtained. Then mix cement to a consistency that will require a small amount of force to bring inlay to place. Introduce inlay at occlusal end first, thus forcing the air out ahead of it, and maintain pressure until crystallization com-

mences. Leave surplus cement to be removed at next sitting, or if removed, varnish well over margins, or bring rubber dam together over end of tooth, tie, and dismiss patient for a few hours. In mouths of hyperacidity, or where cement readily washes away, a procedure originated by Dr. R. H. Hofheinz may be carried out. This consists of excavating two or more shallow pits at the nasal border of the cavity, which fill with cement. Place at cervix at least, or over entire margins of inlay and cavity (at your own discretion), a solution of gutta-percha dissolved in 90 per cent chloroform and 10 per cent eucalyptus. Allow plenty of time for thorough evaporaton of the solvents. In using cement alone, allow an abundance of time for it to harden, as this is the place where many operators fail. Correct occlusion if necessary by grinding opposing teeth.

The perfect cement, like the North Pole, is yet to be discovered, but it is not far away. However, when it does arrive will we then desire porcelain inlays—will not the discovery of an impermeable and durable cement give us an ideal filling material?

Dr. Horbitz of Berlin says, "A porcelain filling holds as long as it preserves the tooth. The peculiarity it has of coming out when it no longer performs its duty increases its value as a filling material. If gold, amalgam and cement fillings, around which decay recurs, would fall out, they would better serve the teeth than by remaining, hanging by undercuts and concealing the carious spots. A porcelain filling shows its defect at once, as it lies on the surface and is apparent."

Howbeit, if porcelain fillings are to be placed, let us give the best, not a "hasty pudding" inlay. The work demands just as careful and conscientious manipulation of detail points as are required for gold and other operative procedures.

EXCISION OF THE MAXILLA UNDER MEDULLARY NARCOSIS.—Dr. Morton (*Amer. Med.*) reports upon the empioyment of spinal cocainization in 929 cases, in 76 operations above the diaphragm, many of the latter being operations on the face and neck. He has found that the analgesia about the mouth is as complete as in the lower extremities, and that constitutional disturbances are no greater in operations about the mouth than they are in operations on the extremities. He is convinced that this method of producing analgesia has its greatest field of usefulness in operations so located that there is danger of blood and secretions entering the lungs. One case of excision of the upper jaw is reported in detail. The author uses half a grain of cocain hydrochlorid and injects it between the third and fourth lumbar vertebræ.

Digests.

EROSION OF THE TEETH. By W. D. Miller, D.D.S., M. D., Ph. D., Sc. D., Berlin. The question of the cause of erosion of the teeth is one of the most puzzling with which the dental scientist has had to grapple, and among the different theories that have come forward it cannot be said that anyone has as yet succeeded in satisfying a majority of the disputants. The exfoliation theory, the chemical, electro-chemical and chemico-mechanical theories—among which the view of Michaels, that erosion is due to the action of potassium sulfocyanid, is to be included—the mechanical theory, the uric acid theory, and finally, the idea that erosion is due to the solvent action of some ferment in the mouth, have all had and in part still have their supporters; but no one of them has succeeded in permanently establishing itself. Recently this question has again been brought to the front by the communications of Dr. Kirk, who has attacked it in an altogether new and original manner, and has brought out some results deserving of the closest consideration. The reader is referred to the original communications.

It is not my object at this time to enter the ranks of the disputants. I shall confine myself to reproducing a few notes, observations and experiments that I have made from time to time on the subject under consideration, emphasizing some points which appear to me to be fairly well grounded and which I think should not be lost sight of in future arguments.

Some cases of erosion. (I) Erosion is an effect observed in healthy teeth with living pulps, as well as on pulpless teeth and on natural teeth worn as pivot teeth or on artificial bases. A well-marked case of erosion (Fig. 1) developed in the course of two years on a piece of ivory which I had set with cement in an erosion cavity in a lower right first bicuspid. (See *Independent Practitioner*, 1888, page 328; also an article by Howe in the April, 1893, issue of the same journal.)

Erosion likewise attacks amalgam as well as gold fillings. A typical case came under my observation some years ago. The patient, a man of about forty-five years, was in fair health with the exception of an occasional attack of asthma and a rheumatic tendency. The erosion was most extensive in the front of the mouth, growing gradually less toward the back, the third molars being quite

free. The facial surface of the six front teeth in particular, as well as the cutting edge or cusp, was completely denuded of enamel, and also a fair amount of dentin had been lost, the two surfaces meeting in a sharp edge about at right angles. (Fig. 2.) On closing the mouth there was a space about one-fifth of an inch wide between the upper and lower rows of teeth. The teeth were exceedingly sensitive to the excavator as well as to changes of temperature and to fruit juices. In 1880 the surfaces of all the teeth were restored with gold, which was well hammered and built down (or up) almost enough to restore the articulation. In the course of five to ten years the gold was for the most part completely worn away, both from the facial surface and cutting edge, although the teeth at last did not come together to within one-fifth of an inch, in some of the teeth only the gold in the retaining points and grooves being left. In the upper teeth the gold, dentin and enamel

FIG. 1.

Erosion of an ivory inlay (*a*). The dotted line shows shape and size of inlay at the time of insertion.

FIG. 2.

FIG. 3.

FIG. 4.

were all wearing away at the same rate, no one of these substances projecting above the others; whatever the cause of the erosion in this case, it affected all three substances about equally, on the cutting edge absolutely equally. Strangely enough, about the year 1895 the sensitiveness disappeared, and the wearing away both of tooth-substance and fillings became much less marked, the patient himself attributing the change to a severe attack of influenza, which he said had also cured two of his friends who were affected in the same way.

Another interesting case was presented by Mrs. H., aged forty-three years. The upper right central, having a wedge-shaped defect near the gums, had been filled with gold. At the time I examined it the filling was cut into halves in the manner indicated in Fig. 3. The neighboring incisors showed deep step-shaped defects as seen in Fig. 4. These and similar cases indicate the action of some powerful mechanical factor, apparently independent of any

acid. Porcelain fillings do not appear to suffer from erosion, while the tooth substance disappears around them as in gold or amalgum fillings.

Chemico-mechanical theory of erosion. (II) One of the most widespread theories which attempt to account for erosion is the chemico-mechanical, which requires a decalcifying action of the buccal secretions, followed by the brush or some other mechanical agent. The following observations are deserving of consideration in connection with this theory. In grinding sections of carious teeth we invariably have the greatest difficulty in getting the carious (decalcified) portion sufficiently thin for microscopical examination without completely grinding away the undecalcified portions. The enamel grinds down fastest, then the normal dentin, and finally, much more slowly and with much greater difficulty, the carious dentin. It is also a universal experience that brittle substances are ground down much more easily than tough, leathery ones. We might grind for ages with a smooth stone on a piece of rubber tubing and still not grind it away. I have seen a case in which a cavity of erosion followed by decay in a lower left first bicuspid had been filled with gutta-percha, and in which the erosion reappeared around the margin of the filling, wearing away both enamel and dentin, above which the gutta-percha filling projected. If we insert a gold filling in a block of ivory and apply a brush with a sharp tooth-powder to it, we will find that the dentin wears away faster than the gold, although it is considerably harder. I have repeatedly made the experiment of suspending a block of ivory in a weak solution of lactic acid, so that about half the block is immersed, removing every twenty-four hours and brushing it parallel with the line of immersion with an ordinary tooth-brush carrying a tooth-powder to which about five per cent of pumice has been added. I find without exception that the unimmersed half wears away more rapidly than the half which is subjected to the action of the acid. May it therefore not be possible that decalcification, instead of being an aid, is a hindrance to the progress of erosion?

Does erosion occur among the uncivilized races? (III) In the *Independent Practitioner* for 1884, page 40, I gave an account of an examination which I had made of some 900 skulls in the anatomical museum of the University of Berlin. In this collection are to be

found skulls from all parts of the world and from all ages. I did not find among the skulls of uncivilized races a single sure case of that form of erosion which has been designated as "wedge-shape defect." This is a fact of considerable significance, to which I again call attention after the lapse of eighteen and one-half years, in the hope that others may be induced to make similar examinations. The question as to whether erosion occurs among uncivilized races ought to be definitely settled, which I do not consider to be possible through the study of the specimens of one museum alone.

Mechanical factors determining the form of cavities of erosion. (IV) The form which cavities produced by erosion assume may be explained, on taking the mechanical factor into consideration, by the form and position of the neighboring teeth, which determine the line in which the bristles of the brush act most vigorously, and in part also possibly by the form of the brush itself, as well as by the physical structure of the tooth. If we brush a slab of ivory, in which the alternating transparent and opaque parallel lines are plainly marked, with brush and powder, parallel to the direction of those lines, we find it wearing away in grooves. There is a lower denture with ivory base and human teeth in the collection of the Dental Institute of Berlin, which shows the same deep parallel grooves, as well as erosion of the teeth at the necks, caused presumably by the brush used in cleansing the denture after meals.

In this journal for 1890, page 253, in a short article on the action of hydrogen dioxid on the teeth, I refer in a note to experiments showing the intense action of certain alkaline substances—in particular caustic potash—upon the teeth, which cause a complete disintegration of dentin by dissolving out the organic substance. The question is then brought up "whether there may not be other substances in the human mouth under certain conditions which in the course of years may in a similar manner dissolve out the organic basis-substance of the teeth, leaving the friable tissue to be worn away mechanically. Attempts to account for erosion by the action of decalcifying agents have thus far not led to a satisfactory solution of the question, and it might be well in future, while searching for the cause of erosion, to bear in mind that the teeth may be acted upon by agents which attack primarily the organic, as well as by those which attack only the inorganic constituents."

This suggestion has recently acquired an increased importance

because of the publications of Arkövy and Preiswerk, who have advanced the idea that certain alkaline substances, and in particular certain bacterial ferments of the nature of trypsin, in the presence of an alkaline reaction may bring about a disintegration of tooth-substance resembling the chronic form of caries. On this I reserve my opinion until experiments now under way shall have been completed.

The tendency of the above notes is to emphasize the importance of the mechanical factor in erosion, to throw a certain doubt upon the necessity of the concomitant action of an acid factor, and to suggest anew the possibility of an alkaline factor, while not as yet expressing my own view as to the actual existence of such a factor. —*Cosmos.*

A SUSPENSION PARTIAL DENTURE. By Dr. P. B. McCullough, Philadelphia. Read before the Academy of Stomatology, Philadelphia, October 27, 1903. The artificial substitution of the two upper bicuspids of either side in a fixed denture, supported by a crown or other device upon a first molar, with the artificial teeth resting upon and forming a water-tight joint with the gum.

The striking natural adaptability of the soft tissues to artificial dental appliances, together with the astonishing tolerance of even abusive measures in the mouth, offers pregnant suggestion of the possibilities in taking righteous advantage. The natural toughness of the gums, the severe use which they will stand after the loss of the teeth, and, as Gray says, of the mucous membrane covering—"remarkable for its limited sensibility"—are physical reasons that make the wearing of artificial dentures possible.

If inflammation without the presence of pathological bacteria is impossible, it is a reasonable inference in the application of a foreign body to a limited surface of gum tissue, with the related surfaces sterile at the time contact is made, and with the adaptation so perfect as to form a water-tight joint, that the joint so effected will be a mechanical dam against infection, and that the surfaces so united will remain surgically clean as long as the dam remains complete.

In contemplating the practical application of a method the success of which depends so much upon cleanliness, only such means as will

insure absolute accuracy in every detail of the mechanical work is to be entertained. To this end, therefore, to parallel the walls of the first molar, to envelop it with a gold crown, and form an accurate joint below the free margin of the gum is, with the devices at present known, a practical impossibility.

When the case presenting is one where the first molar is with-

FIG. 1.

FIG. 2 (upper).

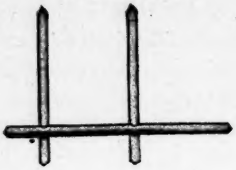


FIG. 3 (upper).

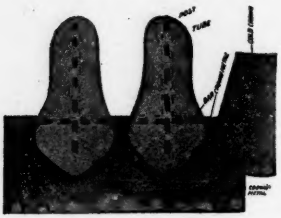
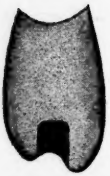


FIG. 4.

FIG. 5.



Showing mesial surface of first bicuspid.

out decay, with a stone a cavity is made in the mesial surface, with parallel walls and involving the occlusal surface. It is extended on the latter surface with a narrow stone cutting in a straight line distally and terminating in the ridge which connects the disto-buccal and the mesio-palatal cusps, into which it is dovetailed laterally. The cavity must be of sufficient depth and the walls diverge slightly

from the floor. In the cavity thus formed is adapted platinum foil, forming a matrix after the methods in vogue for porcelain work. After the matrix has been formed a thin coating of 22-karat gold is melted in and again adapted to the cavity, and repeated after each melting until it no longer yields to burnishing, the walls being first built up, then the middle.

If borax accumulates to such an extent as to interfere with the work it should be dissolved by boiling the case in dilute hydrochloric acid in a test-tube. If by chance the gold should flow to the under surface of the matrix, the gold within should be covered with wax and the plug immersed in nitrohydrochloric acid until clean.

With the finished plug in place a plaster impression is taken that will include the molar and at least the cuspid, when it is not necessary to take the occlusion or bite. The method of attaching the porcelain teeth is the same as hereafter provided for the gold crown.

When the first molar is in such a condition as to suggest any doubt as to the pulp remaining vital any considerable time, it should be devitalized and the entire crown removed, and if pulpless the crown should be likewise ground off below the free margin of the gum.

The only crown deemed fit for this character of work is the one described under the name of the "Burnished-Cap-Crown." (*International,* August, 1902.) The only change made since then is in the use of formaldehyde as a separating medium for the cement instead of the mixture then recommended. The impression is immersed for five minutes in the solution.

By virtue of the typical platinum cap in this crown, when finished it is possible to line the inner edge of the cap with temporary stopping, and by pressing it to place while soft the impression of the root in the stopping will show the operator the direction in which the crown must be pressed to insure its fitting the root exactly as designed. It is particularly necessary to observe this precaution when the crown presses against the second molar, which it should do when the relation is normal.

Preparatory to taking the impression the crown is filled to the inner edge of the cap with plaster, and the pulp-cavity with tem-

porary stopping, when the crown is set with a quick-setting brittle cement and held under pressure until the cement crystallizes.

As it is the purpose in this operation to reproduce the natural lines of the bicuspids, and as the artificial teeth should not be ground before soldering, except as hereafter provided, it is often sufficient to have only as a guide in fixing the length and angle of the teeth a model that will include the crown and cuspid tooth. It is well, however, that it include also the lateral and second molar. When it is deemed advisable to have a model of the occluding teeth, it is necessary to take full impressions of the teeth of both jaws, as partial models cannot be accurately articulated. Before the plaster impression is filled any cement adhering to the crown should be cleaned off.

Of the teeth at present manufactured only the Ash tube-teeth can be used for this denture. They are ground to fit the model with their buccal surfaces parallel with the crown and the plaster cuspid, and one-sixteenth of an inch longer than what it is designed their fixed length shall be. In this position a line is marked on the plaster around each tooth with a narrow knife-blade, then the teeth are removed, and with a suitable instrument the plaster is cut away inside of these guide-lines to the depth of one-sixteenth of an inch, forming depressions in which the teeth should fit. The teeth are then placed in position, taking care that there is space between their approximal surfaces equal to double the thickness of a postal-card, and that the same space is between the second bicuspid and the crown. The spacing is to provide for the contraction of solder. With the teeth so held they are waxed together by coating their palatal and buccal surfaces freely with hard wax, having care to avoid the plaster model.

When the wax has become hard the teeth are taken from the model, and with a square-edge corundum stone a little thicker than the diameter of the tubes a groove is cut between the cusps from the mesial surface of the first bicuspid to the distal surface of the second, and involving these two surfaces, with the sides and bottom of the groove forming straight lines. This groove should be of a depth not less than a sixteenth of an inch at its shallowest points. (Fig. 1.) The teeth are then returned to the model, the sides of the groove marked on the occlusal surface of the gold crown, the teeth removed, and a groove cut in the crown extending distally over

its occlusal surface at least one-eighth of an inch, replacing the teeth as required to insure the edge of the groove being continuous with the groove of the teeth.

A piece of half-round clasp gold wire heavy enough to fit the groove loosely is cut long enough to extend its entire length and into the gold crown, then with the teeth free from the model the bar is held in the groove and the position of the tubes marked on the bar by passing through the tubes a steel pin with a flat sharp edge. Holes are then drilled in the bar at the points marked. Two pieces of round clasp gold wire, long enough to extend beyond either end of the tubes and of a diameter that will fill them loosely, are placed in the tubes and through the holes in the bar. In this position they are hard waxed to the latter, removed, invested and soldered with 18-karat solder. (Fig. 2.) With the teeth on the model the bar is pressed to place to mark in the plaster the points where the posts extend beyond the tubes, then the teeth are removed and holes drilled at the points marked. Extending the posts beyond the tubes is designed to draw the solder. The teeth are then cleaned with boiling water, and with the bar and posts in place returned to the model and firmly tacked to it by applying hard wax only to the palatal and lingual surfaces of the teeth.

When the wax has become hard the bar is removed and crown metal, two one-thousandths of an inch, with the gold surface next the porcelain, is thoroughly adapted to the groove with wet spunk and orange-wood sticks, frequently annealing. The metal must be large enough to extend beyond the mesial surface of the first bicuspid one-eighth of an inch, where the plaster cuspid is cut away, and above the occlusal surface one-fourth of an inch, and into the groove in the crown one-sixteenth of an inch. After the metal has been perfectly adapted, with the pencil-point of an orange-wood stick it is burnished over each tube until punctured, then with pressure and a turn of the stick the extended edges of the punctured holes are burnished to the inner surfaces of the tubes. Thus the porcelain is protected. Before the metal is fixed in place holes are punched along the two edges extending above the teeth, which when filled with the investing material will keep the metal from warping.

The bar with posts is then dropped in place to see that the position of the teeth has not changed during the burnishing, then removed, and a small quantity of hard wax placed in the metal groove,

the bar heated and dropped in place to carry the wax through the tubes, then hard wax is added until the metal matrix is nearly filled and the bar thoroughly waxed to the crown. (Fig. 3.) After the wax has become hard the wax holding the teeth to the model is carefully cut away, the crown pried off, with the teeth attached, and invested.

When the investment is set the wax is cleaned off by "pouring" boiling water, and a drop or two of borax finely ground in water is carried with a stick to the tubes and around the bar at the joint with the crown, then, a piece at a time, the 16-karat solder is taken from the plate, each particle wet with borax, and applied until all the solder that will be required has been placed. The case is then placed upon a charcoal bed so that the blow-pipe can be held to one side, directing the flame under the investment. The flame at no time should be directed on the metal before the solder melts. The heat must of course be increased gradually, but should not take longer than from ten to fifteen minutes to solder. The practice of long drying out and heating up is not only unnecessary but probably harmful. The metal surface should be immediately covered with a piece of glowing charcoal and the case left undisturbed for from twenty to thirty minutes to cool, when, after removing investment, the case is placed in dilute hydrochloric acid in a test-tube and boiled; thus the borax is quickly removed, and what is more important, the teeth are annealed.

The only care necessary to observe in finishing is that the metal be not cut too thin where it bridges the spaces between the teeth, and particularly at the crown, where the strain will be greatest. (Fig. 4.) The ends of the posts extending beyond the tubes at the surface fitting the gum are ground down flush with the porcelain surface and the latter polished, finishing the edges with emery and cuttle-fish disks. (Fig. 5.)

While a pulp-cavity of retentive shape will be sufficient anchorage for any molar crown of the system referred to, it is not enough when other teeth are supported; therefore dowels or pins must be placed in the three canals long enough to extend into the crown, and they should be made as described for the dowel crowns of this system. They should be set with the same mix of cement that holds the crown, as by this means with the pressure the cement will be better packed around the pins. Great pressure should be used

to force the crown to place and maintained until the cement hardens, which with some cements requires from ten to twenty minutes.

If the porcelain teeth press so hard upon the gums as to make it impossible to force the crown to place they should be ground off; care, however, must be observed that the surface is evenly ground and that the arc of the concavity fitting the gum is not changed.

It is well to oil the surfaces of the teeth fitting the gum, then any cement between the teeth and gum can be removed by passing the end of a piece of binding wire through one interdental space and out the next, thus forming a loop which can be drawn over the top of the tooth.

In the same way a loop is made with linen or silk thread, then saturated from a piece of cotton wet with formaldehyde, and pulled through between each tooth and the gum. If the lower teeth "strike," the points of contact should be marked with articulating paper and the spots ground off the lower teeth; the cusps of the artificial teeth may be ground, but care should be observed that if the gold is cut it is not at points that would weaken the denture.

It is designed that the extent of gum surface covered shall be equal to that displaced by the natural teeth, thus the area involved will be less in proportion to the degree of shrinkage.—*International.*

PRINCIPLES UNDERLYING THE INSERTION OF PROXIMO-OCCLUSAL GOLD FILLINGS IN BICUSPIDS AND MOLARS. By C. N. Johnson, L.D.S., D.D.S., Chicago. Read before the New York Odontological Society, January 19, 1904. Though it would sometimes seem that this subject had been discussed to the extent of leaving nothing more to be said upon it, yet its importance as a factor in the preservation of the natural teeth merits so clear an understanding of the principles involved in the performance of the operation, that what might otherwise appear a tiresome and needless repetition becomes permissible. As stated by Dr. M. L. Rhein, "The member of the profession whose life is spent day by day, hour by hour, in untiring efforts to preserve man's dental organs, can never fail to find this subject interesting and inspiring." It is in this spirit that the subject is brought before you at the present time, not with the idea of introducing something new or novel, but merely to consider some of the fundamentals of the operation, and to discuss several features upon which there

seems to be among men of discernment in the profession a slight difference of opinion.

Objects of a filling. At the outset there should be a definite understanding of the objects to be gained in the insertion of such a filling, and this followed by a study of the best and simplest means of bringing about the desired result. The first object in the insertion of any filling in a carious cavity in a tooth is to seal the cavity against leakage. A leaky filling may not immediately lead to failure, but if the leak be great enough to admit the microorganisms of caries it is only a question of time when decay will take place around the filling. The next object is to anchor the filling securely against movement under the stress of mastication; the next to protect the cavity margins against disintegration of the enamel rods surrounding the filling; the next to make a filling sufficiently dense that there will be no compression of the filling material under ordinary stress; and last, but in the class of cavities under consideration by no means least, maintenance of proper contour to preserve the interproximal space in its normal form, and afford protection to the gum tissue lying in it.

In the fulfillment of these objects there are two chief considerations to be observed—the preparation of the cavity and the insertion and finishing of the filling. It is manifestly impossible in the brief space allotted to one paper to consider the entire operation in detail, and we must content ourselves with a mere glimpse at some of the more prominent features, and try to study the chief essentials to success.

Preparation of approximal cavities. When decay begins on the approximal surface of a bicuspid or molar it usually spreads from the initial place of penetration near the contact point till the outlines of the cavity extend rootwise under the free margin of the gum, occlusally till the occlusal surface becomes involved, and bucco-lingually till an explorer will catch on the margins of the cavity when passed over the surface of the tooth in these regions. This leaves a cavity somewhat curved in outline with the convexity of the curve along the gingival wall presented toward the alveolar process. It is becoming quite generally recognized that in the preparation of such a cavity the best results are to be obtained by changing the gingival curve to a horizontal line, thus accomplishing two objects. These objects are both important so far as

the permanence of the filling is concerned, and relate to the prevention so far as possible of a recurrence of decay at what has become known as the vulnerable points of such a filling—the gingivo-buccal and gingivo-lingual angles—and to the greater stability of a filling seated on a flat base over one seated on a curve.

Preparation of gingival wall. It is not the present intention to go into details of cavity formation, but one small matter must be mentioned on account of an apparent misconception on the part of some in connection with it. When a flat gingival wall is advocated it is not meant that the marginal outline of this wall should join the marginal outlines of the buccal and lingual walls at sharp right angles. There should invariably be a short curve instead of an abrupt angle to the enamel where one wall joins another. But in the interior of the cavity, or in other words, in the gingivo-axio-lingual regions the walls may join at sharp right angles, and this is the entire extent to which any undercutting or grooving need ever be carried in this region for the greatest stability to the filling and the readiest possible means of starting the gold. No grooving in the ordinary acceptance of the term is ever necessary.

The buccal and lingual walls should be as nearly as practicable parallel, and they should join the axial walls at right angles up to a point near the occlusal surface where the curve of enamel arching over the cusps interferes with such a form. The anchorage step in the occlusal surface should have a flat base, and the surrounding walls of the step should rise parallel from this base. The enamel margins should be beveled in the regions where there is danger of the peripheral ends of the rods being left unsupported and likely to subsequently crumble and cause a leak around the filling.

It will be noted that in this form of cavity there are no deep undercuts or grooves, and no small pits for the purpose of starting the gold. It is deemed wholly unnecessary to resort to pits for starting gold fillings unless cohesive gold is used from the beginning to the end of the filling, and it is one of the objects of the present paper to try to prove the desirability of employing non-cohesive gold at least in the early stages of the operation.

Non-cohesive gold at cervical wall. If it is true that one of the chief objects in filling such a cavity is to seal it against leakage, then the readiest method of sealing it becomes a matter of considerable importance, and the fact that non-cohesive gold may be

more easily adapted to walls and margins than cohesive commends it to our attention. By this statement it is not intended to imply that cavities cannot be successfully sealed with cohesive gold. It has been demonstrated repeatedly that cohesive gold may be adapted perfectly to cavity walls, yet this does not alter the general proposition that for this purpose non-cohesive gold is far superior. If we study the characteristics of the two forms of gold we shall soon discover why this is true. Cohesive gold, as its name implies, is gold of which two or more sheets when brought into intimate contact will cling together and become one piece. In other words, they will weld cold under pressure. This welding property of gold is of great advantage in making a strong filling and in building fillings out into contours, but it correspondingly detracts from the ease with which such gold may be closely adapted to cavity walls. The greater the tendency of the layers of foil to cling together the greater the difficulty in forcing them across each other to make them assume a new relation one to the other so as to bring them into intimate contact with the walls of the cavity. In fact, to secure perfect adaptation of cohesive gold it must be used in relatively small pellets, and all expert gold manipulators have long since recognized this. To insert a large filling of the type under consideration entirely of cohesive gold, and to be assured of perfect condensation and perfect adaptation throughout, is necessarily a very exacting and wearisome operation. With the nervous organization of many of our patients of the present day such an operation is in most cases ill-advised, to say nothing of the matter from the dentist's point of view.

The plan suggested by Dr. Rhein to overcome this difficulty, namely, dividing the operation into several sittings by inserting a portion of the filling, and then sealing the remaining cavity with gutta-percha and dismissing the patient till another appointment, thus making the filling in sections, has to the mind of the writer some serious disadvantages. It is too much in the nature of making several bites of a cherry which should be taken in one. It is a matter of more or less aversion with the average patient to have the rubber dam applied, and to multiply this operation several times for the insertion of one filling seems hardly desirable if there is any way of avoiding it. Then again, when the surface of gold in the incomplete filling becomes moist, as it must by this procedure, or

becomes contaminated by packing the gutta-percha over it, its cohesion is destroyed and there is no process or method of manipulating the gold on this surface which will ever bring it back quite to the condition it was in at the moment the plugger left it. While a filling inserted in this way by a painstaking and skilful operator will undoubtedly do good service it can never be so perfectly homogeneous as if it had been inserted at one sitting, and the aggregate amount of time spent in the several sittings will be appreciably greater owing to the necessity of repeated preparation for the operation in the way of applying the rubber dam and other minutiæ.

It may be said in passing that with cavities so large that the insertion of the gold at one sitting will prove too great a tax on either the patient or operator there is a better means of managing such cases, a means which is daily assuming a wider range of usefulness as we become more familiar with its possibilities. This is through the medium of gold inlays—a subject which, though not up for discussion at this time, must be reckoned with in studying the class of cavities under consideration.

Combination of non-cohesive with cohesive gold. But it is confidently believed that there are many cavities which can readily be filled by employing a combination of non-cohesive gold with cohesive, which with cohesive alone would prove too taxing. As has already been intimated, non-cohesive gold may be used in larger masses than cohesive, and with the assurance that these masses may be carried to place so as to perfectly fit the cavity walls and to lie in the most intimate relation one to the other. The fact that the layers of foil in a non-cohesive cylinder will slide across each other under pressure without cohering renders it possible to force the gold into the most inaccessible angles and corners of the cavity and also to compress the various layers into the closest possible coaptation with each other. The force of the plugger impact is conveyed through a larger mass of gold and to a greater distance because it is not interfered with by cohesion of the particles.

It is for this reason that an operation may be very materially shortened by employing non-cohesive gold in certain parts of the filling where adaptation is of the greatest importance, and where there is no attrition in the process of mastication. The gingival third or even half of some of these fillings may be made of non-cohesive gold, with the best possible results, in much less time and

with less exertion than if cohesive gold were used throughout, and the fact that the method is effective is amply demonstrated by the existence of many such fillings doing good service and saving the teeth for years. It is not claimed that a filling thus made is of equal hardness throughout to one made exclusively of cohesive gold.

If for any reason it ever becomes necessary to drill into such a filling it will be found that after the drill has laboriously forced its way through the cohesive gold it will at once sink into the non-cohesive gold and bur it out without difficulty. This naturally gives the impression of softness, and in the minds of some operators leads to a doubt as to the stability of a filling so constructed. But if the philosophy of the subject be studied it will be seen that this particular kind of softness is not so objectionable as it would appear in the positions where non-cohesive gold is properly indicated.

The only thing we have to guard against in these positions is compressibility. If this apparently soft mass would compress under the impact of force brought to bear upon it by stress against the cohesive gold lying over it, we would then assuredly have a failure of the filling, and it may be said parenthetically that fillings have failed in the past through this cause where the covering of cohesive gold has been too shallow and the non-cohesive gold has not been perfectly condensed underneath it. There is positively no danger of compression or movement of the non-cohesive gold provided it is anchored on a flat base with parallel perpendicular walls, such as has been advocated for the cavities under consideration, and also that the gold is made perfectly dense by the proper placing of the non-cohesive gold, the proper arrangement of the layers of foil constituting the rope, cylinder, or pad which is being employed to start the filling, and by the requisite degree and character of plugger impact to thoroughly condense the gold and leave no air spaces throughout its structure. If the layers of foil are brought into intimate contact with each other and with the cavity walls the gold so placed will sustain all the force necessary to make a stable filling, and if it is not built out to where it is subjected to attrition or to a leverage stress so as to be endangered by a break there is no element of weakness in its construction.

In speaking of the arrangement of the layers of foil it is meant that where ropes are used for starting fillings they shall be sufficiently thick that when laid on their side along the gingival wall

the layers constituting the rope shall reach from the axial across the gingival wall and extend beyond to the extreme approximal surface of the finished filling, and if cylinders are used that they shall be large enough that no matter which way they are laid on the gingival wall they will reach well across it mesio-distally. This insures a continuity of structure to the filling, which prevents flaking or crumbling and permits of the closest possible relationship of the layers.

Technique of the operation. In the technique of this operation the details are somewhat different from those in the insertion of an exclusively cohesive filling, and it may be well to consider briefly some of the more prominent features of distinction. In the starting of a filling with non-cohesive gold hand pressure becomes an important adjunct, and this supplemented by a few blows of a heavy soft mallet will be all that is necessary in carrying the non-cohesive gold to place previous to the introduction of cohesive gold over it. A light or rapid mallet is contraindicated with non-cohesive gold, for the reason that such a mallet does not have condensing power sufficient for a mass of gold as large as is usually indicated in starting the class of fillings under consideration. What is most needed is to have the impact carried some distance beyond the immediate point of application, and this can be accomplished only by a heavy soft mallet. With a light hard mallet the energy is concentrated at the point of impact and so does not extend far beyond the serrated end of the plugger. This is an excellent blow for condensing gold in small pieces and for hardening the surface of the filling, but with non-cohesive gold the only result is to chop it up into a disintegrated mass. To condense non-cohesive gold requires few movements with hand pressure and few blows of the mallet, but the force of either hand pressure or mallet blow must be appreciable. It must be driven to place with vigorous thrusts, and the efficacy of the thrust is greatly accelerated if when the pressure is brought to bear it is supplemented by a wrist movement whereby the handle of the plugger is made to describe the short arc of a circle. This movement forces the gold into the most intimate contact with the walls of the cavity, besides facilitating the operation by pressing the gold laterally away from the shank of the plugger, so that it may be withdrawn without dragging the gold from the cavity. For condensing non-cohesive gold in this way pluggers with a broad end and deep serrations are indicated, so that the plugger point does not puncture the gold and

disintegrate it and so that the surface is not left too smooth to admit of the attachment of cohesive gold to it. The first pieces of cohesive gold should be well annealed and driven into the structure of the non-cohesive, so that the attachment may be made by an interlacing of the two forms of gold rather than by depending on cohesion.

From this point to the completion of the filling the operator may use any form of mallet best adapted to his individual needs. In cavities easy of access the filling may be built more quickly by the rapid mechanical mallet or the electric mallet than by any other means, but there is one feature in the use of these mallets which must be recognized to insure success in their use. They do not carry the impact far beyond the serrated end of the plugger, and they cannot be used for condensing thick pieces of gold. Furthermore, the velocity is so great that the molecular tension of the gold is rapidly raised to the point of interfering with its cohesion. It will be noticed that if a rapid mallet is allowed to play for any time on the surface of a filling it is difficult to make another pellet cohere to it, and this has been the means of causing many operators to discard this form of mallet. With those who use these mallets successfully there has been a close study of their peculiarities in this regard, and a quick intuition which teaches the operator the precise moment to cease malleting. In the hands of one expert in their use it is possible to do the very best work with them, and they are especially adapted to giving a satisfactory surface to the filling. It is of course desirable, with fillings subjected as these are to the full stress and attrition of mastication, to obtain the hardest possible surface, and the rapid mallets are peculiarly fitted to accomplish this. It is a well-known fact that gold may be appreciably hardened even after full density has been reached by repeated mallet impact, and the character of the blow struck by a rapid mallet is an ideal one for this purpose. If a mallet of this kind be allowed to play over the surface of such a filling for any time it will soon be found that the gold will ring almost like steel, and the result will be the best possible wearing surface that can be given a gold filling.

Maintenance of the interproximal space by contouring. In studying the question of contour and the best means of maintaining the interproximal space in its normal form we approach one of the most important considerations connected with the subject. Patients to-

day with their highly wrought nervous organisms are complaining more and more of the irritation produced by the wedging and lodgment of fibrous food between the teeth, and unless we rise to the necessities of the case and make our fillings so that the teeth are comfortable for mastication we are falling short of our true function as dental operators.

As a guide to the form which should be given fillings on their approximal surfaces, it is well to study somewhat closely the natural form of the teeth previous to decay. If this be done it will be found that the actual area in contact between normally formed human teeth is exceedingly small, and when we look into the philosophy of this we see that there is an excellent reason for it. The food of man is diversified, and certain varieties of it are fibrous in nature. In the mastication of this fibrous food it is inevitable that occasionally some of the fibers will be forced between the approximal surfaces of the teeth, and if the contact is broad the fibers will be retained, to cause discomfort to the patient and induce decay in the approximal surfaces. It is precisely this which occurs when flat surfaces are left to fillings, and many cases of recurrent caries around fillings otherwise perfect may be traced to this.

In making these fillings they should be built out boldly into close contact with the adjacent tooth as they approach the occlusal surface, and this rounded outline should not be destroyed nor cut away in finishing the filling. It is of course necessary in inserting the gold, whether a matrix is used or not, to build a slight excess of the material over the margins to be assured of perfectly protecting the enamel, and this excess must subsequently be trimmed away to a symmetrical conformity with the original outline of the tooth. In doing this great care must be exercised not to cut away the contact point and make it flat, and this may readily be accomplished in the following manner: Leaving the gold full and tight against the contact point of the approximate tooth, attention should first be directed to finishing the filling in the interproximal space. No attempt should be made to pass anything between the contact points at this stage of the operation, whether strips, disks or other accessories, and the approach to the interproximal space should be made from the buccal aspect. A thin burnisher should first be used to smooth the gold and burnish it over the margins, and if when this is done it is found that there is much excess of gold to be dressed away, it may best be done

with narrow files or keen-bladed trimmers. When the gold is nearly brought to form a narrow finishing strip, inserted from the buccal aspect, may be used to complete the work and put on a desirable finish.

The filling now presents with the gingival portion in the interproximal space perfectly polished and in proper outline, so that the separator may readily be adjusted to gain space for finishing the remaining portion of the approximal surface. If the filling is wide bucco-lingually, so as to expose the gold well in these directions, a sandpaper disk may be used to finish the buccal and lingual margins as they round up over the cusps, but it should not be allowed to play between the contact points through fear of flattening the gold. The object should be merely to round the gold at the contact point and polish without cutting it away. This can best be accomplished by first forcing a broad and very thin steel instrument, like the Dunn hand matrix or the Thorpe flexible spatula, back and forth between the contact points to smooth the gold and make room for a wide and fine-grit finishing strip. The object of having it wide is that it will cover the entire surface of the filling in this region and not impinge at one point exclusively, and it should be fine, so that it will merely smooth and polish the surface instead of cutting it away. By this means a marble-like contact may be made between the filling and the approximating tooth, the two knuckling tight together when the separator is removed.

Finishing the occlusal surface. The finishing of the occlusal surface of the filling is a simple matter, which may well be left to the individual methods of each operator, the only suggestion being that in those cases where the cusp of the opposing tooth is likely to exert a wedging force upon the filled tooth, tending to split it, the cusp be ground shorter and somewhat flattened on its tip to insure greater safety to the filling and to the tooth containing it.

In concluding what is already too long a paper your essayist cannot forbear mentioning one further point connected with the wedging of food between teeth. It will occasionally be found that even with teeth filled as carefully as we may there is complaint on the part of the patient from this cause. In fact, we find teeth which have never been filled and in which the contact seems perfect giving trouble. In cases like these it will usually be found that the relation of the occluding tooth is such that a sharp cusp is projected on

closure of the mouth against the point where the two affected teeth are in contact, in such a way as to spring them slightly apart and force the fibers between them. If there be doubt of this, a bite taken of the teeth and a plaster cast made will usually reveal it. The remedy is to grind the offending cusp away very freely, a procedure which in the experience of the writer has been the means of bringing relief to a great many suffering patients.—*Cosmos.*

DENTISTRY AN ART OR A SCIENCE? By Dr. George H. Belding, Milwaukee. What one hundred years ago was a crude trade juggled from blacksmith to barber has grown to-day to be a great profession, doing an inestimable amount of good by preserving health, beautifying personal appearance and adding to the general comfort of mankind. Out of this growth of the dental profession has developed two schools. One teaches that to be a dentist is to be an artisan, a skilled operator, an expert doer of things, a possessor of technique and manipulative ability. To the other school belong men who look deep into the mysteries of dentistry, the ones who class it as a part of medicine and who find in laboratory experiments a means of broadening our profession.

Art in dentistry. The first school for a standard takes art, while the other holds science up as her guide and director. Much of dentistry is art. Art in dentistry is the doing, the constructing. To insert beautiful gold fillings, construct with a trained eye and an educated finger porcelain inlays, manipulate filling materials with exactness and precision, make and adjust regulating appliances, construct plates, crowns and bridges, is art. To extract teeth is art. To manufacture obturators and splints is art. Art in dentistry is the manipulating, the operating, the completing.

Science in dentistry. On the other hand, science is the knowing. To know that correcting irregularities will restore normal occlusion, which in turn will cure defective hearing, neuralgia or headache, is science. Science enables us to recognize disease, to differentiate one from another, and to treat it successfully. To know what teeth must be sacrificed to the forceps and to know when to extract deciduous teeth is science. To judge of the condition of the mouth, that we may construct or have constructed a plate along lines that will make it useful to the wearer, is science. To study conditions by comparing the normal with the abnormal, that we may be enabled to

distinguish pathological functional disturbances from metabolism, is science. To trace some local manifestation of pain in the mouth to some diseased condition of the general system, or to note some general diseased condition as the effect of some local lesion, is science. The bacteriology, histology, pathology, physiology, anatomy and chemistry of dentistry is science.

Art versus science. Art in dentistry and science in dentistry have each grown to such large proportions that but few men can attain eminence in both. The men standing for art hold that too much time is spent teaching our students the science of dentistry, that they receive too little instruction in manipulative art, that students are taught too much bacteriology, that too little stress is laid upon the importance of practical prophylaxis, that too much study is given to general anatomy and not enough time to the anatomy of the mouth, nose and throat. The science men tell us these same students have not sufficient knowledge to enable them to correctly diagnose disease or to successfully treat pathological conditions. Both claimants are right, and to better this condition is what we must strive for. Perhaps we cannot arbitrarily divide our work into two distinct branches, that is, we cannot learn art without learning some science, nor can we learn science wholly isolated from art, yet sooner or later, that we may become competent either as an art dentist or a science dentist, we must divide our work. Some of us must do the mechanical work and others take up the scientific part and become science dentists. As a skilled operator the American dentist has reached a high mark and his reputation in this line has reached the zenith, but we have a field in dentistry, broad and almost unoccupied, to fill.

The realm of stomatology. Unless the dentist fits himself for this work it must go undone, for the average physician is as ignorant of the diseased condition of the mouth as the average art dentist is. To occupy this field we must know more of oral surgery, more of oral hygiene, more of the cause of caries, more about abscesses and their treatment ,and much more about the different forms of gingivitis. How few physicians recognize pyorrhea and understand that the stomach will be deranged in this disease because the acid secreted by the stomach is not sufficient to disinfect all the pus passing into the stomach. We should know more of physical diagnosis, that we may determine how severe an operation our patient can endure in

a dental chair without suffering from shock. A correct physical diagnosis would in a large majority of cases enable us to decide as to the advisability of administering a general anesthetic. To treat and diagnose different forms of stomatitis, different forms of gum lesions, to treat neuralgia and trace its effect to the cause, to make a diagnosis in obscure cases, should be our great aim.

To prescribe for a patient whose general health is suffering on account of diseased teeth or gums, to successfully treat sinusitis, empyema of the antrum; to perform operations in the mouth, such as replanting, implanting, transplanting, removing growths, to perform operations for cleft palate, hare-lip, and to make exsections of the maxillary—all are the work of the science dentist, but he must do more—namely, he must be able to treat the patient's general system before and after the operation. He must know when to operate and when to refuse to operate, and this is ascertained only by knowing the patient's general condition. A patient suffering from nephritis in its different forms should be refused an operation by the oral surgeon, and the only exact way to recognize these conditions is to make a urinary analysis.

If a patient presents showing an opening through the hard palate caused by a syphilitic ulcer, the dentist should not only treat and provide covering for the local lesion, but to attain the greatest success he should prescribe for his patient's condition by instructing him to clean his mouth thoroughly three times a day, live on a liberal diet, refrain from eating green vegetables and fruits, and for medical treatment use iodid of potassium and mercury given in milk. In all cases the operator should, if possible, associate the lesion in or about the mouth with some general condition and treat in the best possible manner.

A seven-year college course suggested. Having made an effort to show that our work in dentistry should be divided into two distinct classes, I now propose this plan for our colleges—that two courses be instituted, one requiring seven years and the other four, and that each student according to his tastes may fit himself more thoroughly in one or the other divisions of dentistry, one teaching all of the science and the theory of art, the other teaching all of the art of knowing how and little of science. One course teaching how to treat disease and pathological lesions successfully, the other fitting us to become skillful and mechanical operators; one teaching the

practical side of scientific dentistry, the other teaching the practical side of manipulative and artistic dentistry. Now which shall we choose? Shall we strive to learn more of science and help raise the profession to the standard of medicine, or shall we be art dentists? Shall we be of the class that executes or of the class that directs? Shall we be the imitators or the originators? Shall we be one of those employed in an office making porcelain inlays, filling teeth, making plates, constructing crowns, bridges, etc., or shall we be the one at the head of the office whose scientific knowledge enables him to diagnose each case as it comes and to dictate such operations as are best indicated.—*Items.*

SOME FAULTS OF THE PREVAILING DENTAL TRAINING. By J. D. Patterson, D.D.S., Kansas City, Mo. President's address before the Institute of Dental Pedagogics, Buffalo, December, 1903. In directing attention to this subject I must disclaim any intention to criticise without an ultimate object, and that is to assist in the correction of errors which seem to have been grafted firmly upon the system of dental education. "It is easier to be critical than to be correct," said a noted Englishman, but it must also be remembered that unless there is weakness in the thing criticised there can be no strength in the criticism. The faults which I desire to comment upon may be divided into two classes: First: Faults fostering a low grade of professional spirit. Second: Faults in the methods of practical and theoretical instruction.

Dentists Not Respected by the Public. It certainly needs no argument to support the statement that the public does not accord to our calling the meed of respect and honor which we believe it demands on account of the benefits it confers in giving comfort to human beings, and which it does accord to ministry, the law and to medicine. Each of us has repeatedly suffered from some humiliation caused by slighting allusion to the status of the dental practitioner. Is it deserved? I think it is. Can this be corrected? I firmly believe that within a quarter of a century public opinion can be moulded aright in this matter, and I believe it is the duty, within the province, and perfectly possible, that the Institute of Dental Pedagogics can bring about the change. In proof of this statement I place before you the following summary of facts: *In any profession its dignity and high regard in the eye of the public must ever be dependent upon*

the individual personal influence of each of its members. The public cares nothing for us save as individuals or groups of individuals, but the individual gives the true standard of respectability of the profession to which he belongs. Now where does the responsibility lie in the selection of individuals and the moulding of those who will hereafter dominate the standard of the dental profession? Does not the responsibility lie with the association?

In these times no one except in isolated cases can gain entrance to the dental ranks save through the medium of the dental college. The faulty result of dental teaching lies either in accepting unfit students or in the faulty teaching of those students. The teachers are the ones who determine or advise what the preparatory ability of a student must be as well as guiding him after acceptance, for in no one of our colleges is the business management separate from the teaching force. You may declare that this association is solely devoted to elaboration of teaching methods and that the questions of legislation and administration lie with the Faculties' Association and should not be touched upon here. In answer I will say that the divorcement of the consideration of methods of instruction from the consideration of methods of administration in my opinion is an impossibility. The segregation of related interests in our professional advancement is unwise, and if this association is in fact as well as name a national one, no discussion of teaching methods is logical if prominent factors in dental education are tabooed.

Faculties' Association Derelict. Again, the National Association of Dental Faculties, whose objects are supposed to be varied, among which is the subject of legislation, administration and police control over dental education, *is a legislative body which too often does not legislate; an administrative body that does not administer,* and whose requirement of obedience to rules is elastic, varied to suit the individual case. The Faculties' Association in late years has made the mistake of apparently believing that better dental education is measured by increase in the length and number of courses instead of making a better selection of talent and acquirement. The prediction is hazarded that extension of number and length of courses will tempt to accept still more of kindergarten material with the idea that the lengthened time will allow for making up deficiencies.

The desired work of improving the standard of the graduate can-

not be left to that association, for it has not been faithful to its trust. I speak with all calmness and certitude, and the record will substantiate me in stating the claim that since the Faculties' Association in 1897 in an illegal manner abandoned the advanced standards which it had adopted in 1896, and which advanced standards in their elaboration would unquestionably have brought a rapid advance in the professional standard in dentistry—that association cannot be credited with any advance towards making our calling dignified and professional. The average intelligence of students in late years has not improved, and a same dead level of indifference to everything but a diploma and the money it will enable them to grasp exhibits itself in the great majority of those we are called upon to instruct. The result is the multiplication of low grade practitioners, who in their student hours give a smile of derision when an enthusiastic teacher pleads for a high plane of living and doing in dental professional life, and whose name after graduation is found in the cheap advertising page, or as the employe of the "Dental Parlor" proprietor. As the years have gone along it has been the hope of the enthusiastic that the personnel and intelligence of students would steadily improve. To those who have carefully observed the subject the hope has died, and they turn to seek a new and different force for uplifting. The treason of 1897 and its results stamps distrust on the idea that any good along the desired lines shall come out of the wisdom of the Faculties' Association. To what agency then shall we turn in the emergency? *Undoubtedly to this Institute.* It is not my purpose to advise this body to legislate, but it can so advise and *insist upon reforms that reform will be brought about.* If each individual in this body will pledge himself to demand better material, that can be moulded into gentlemanly behavior, as well as superior, practical acquirement, there *must come a practical result.*

Count System of Credits. Under the first heading the second error I will note is that of ignoring the Count System of Credits, both in preliminary requirements and in the actual training. This will receive only brief attention. It seems strange that when a perfectly feasible method of positively perfecting credits for acceptance and advancement is at hand, that it has been rejected by an almost unanimous voice in the Faculties' Association in 1897, and the same fate will probably be given to the measure in 1904. We crave the careful consideration of every member of this Institute to

this measure and his support for its adoption in dental education, so that credits either for preliminaries or advancement shall be given *alone by merit for work accomplished* and certified to, and not at the behest of individual minds nor for any purpose ulterior to the best in dental education. Every member of this institute should support the movement which is again attempted, and endeavor to place dental education on the same basis of credits which has been adopted by the best literary and professional systems in the old and new world.

Teaching of Dental Ethics. The third fault which I notice under the first head is that our teachers do not teach professional ideas and duties sufficiently. They should make it convenient to frequently explain what constitutes a profession—why dentistry is a profession—should combat unprofessional ideas, and illustrate how degrading are their influences. It should be taught daily that no profession more demands the gentleman than ours. *This teaching should be a keynote.* There are those in our classes who otherwise are acceptable students, but whose knowledge of the duties and obligations pertaining to professional life is entirely wanting or at best is extremely vague. To them they must be *earnestly* taught. The teacher must do this both by precept and example, for each one must remember that *"professions pass for nothing with the experienced when connected with a practice that flatly contradicts them."* The teacher by personal example then must teach professionalism. If he cannot or will not do this there is no place for him on the lecture rostrum, in the laboratories or the infirmaries of a dental school as an instructor of young men who some near day must necessarily dominate the profession of our choice and by their fruits decide whether its future shall stagnate, retrograde or improve. When our eyes view the average grade of intelligence in our graduating classes of to-day respecting the duty of professional men, is there not often a shiver of apprehension? The question surely demands a very careful consideration from members of this body.

Rejection of the Unfit. Lastly under this head we come to the fault in dental education which is presented in the fact that when dental students give positive evidence of their unfitness for the profession they are usually encouraged to continue instead of being earnestly advised to abandon the work, or even commanded to do so. In earlier days the apprentice system did the winnowing, and the

student who was unfit was so advised and discharged from the office of his preceptor. Personally I know of two such cases in the office of one of my preceptors in 1865 and 1867, and of other instances. This, it must be acknowledged, is an admirable feature of the apprentice system, and one of the reasons which has caused the writer to advocate that system as a prelude to dental college training. In the college this winnowing has not been accomplished. The student, without his own knowledge or the knowledge of any one else as to his fitness for dentistry, very often comes to the college from a long distance under a considerable expense, with ideas undefined except as to the curious belief that dentistry affords *"an easy way to make money,"* and when he finds himself mistaken it is usually impossible or impracticable to recede, for money has been expended and the expectation of relatives and friends must not be disappointed. He must "willy nilly" proceed. He does so, and the profession is burdened with his compelled presence. Every teacher in this association should *strongly* advise the unfit student at the earliest possible time to seek other avenues of life work, even if it is at considerable sacrifice. The apprentice system is evidently impossible as a compulsory measure in this country; the sentiment is, I think, strangely against it; therefore if a student leaves the work after entering college, it will be by the teacher's advice. I *counsel to give such advice.* If it is given through correct motives and on unmistaken evidence it will, I assure you, usually be followed, and the teacher will thus do his share to mitigate this faulty and unfortunate situation.

Diverse Teaching in College Courses. Under the second head of this division of our subject we come to the fault found in the lack of cooperation and uniformity in methods between lecturers and demonstrators. In the major part of teaching there is a standard which should admit of little or at least of unimportant variation, but we are confronted with the fact that the lecturer advises certain lines of practical procedure or gives a theory which in the laboratory or infirmary is diametrically opposed or seriously modified by the demonstrator. So has arisen much confusion that has led the student to uncertain results. Such is not the case when the professor superintends in the infirmary what is said from the lecture stand, but personal observation teaches that very often the lecturer is not a visitor to the infirmary or the laboratory, and those demonstrating

do not harmonize with what has been said from the lecture stand. Again, different demonstrators recommend and direct opposite procedures when only one method should prevail. This fault should be corrected by the selection of only experienced teachers—and frequent faculty meetings in which the teaching should be outlined so far as possible along uniform lines. This brings us to the fault of employing men as teachers and demonstrators who are of indifferent skill and limited experience, and who are secured at a salary which never can obtain the best service.

Lack of Demonstration. The next fault we notice, and a most noticeable and direful one, is a too limited number of demonstrators in laboratory and infirmary. The instruction and detail in practical work can never receive the necessary supervision which is due the student and which is absolutely necessary while one demonstrator has under him so many pupils and so many operations which demand his attention in the same hour. Personal experience and close observation convince me that this fault is most serious. I have never entered laboratory or infirmary in the college with which I am connected, or in those of other schools members of this association, but I am confronted with this fault. Each demonstrator in the busy hours on account of the number of students under him has so many demands upon him that if he devotes necessary time to a few the many are neglected, and if he endeavors to direct all he does it so imperfectly and hastily that nothing is done satisfactorily either to himself, the student or the patient. I hear you say that this is well known and admitted, but why find fault unless a remedy is offered? Very true—the criticism lies—but I do propose a remedy, and the remedy must be in increasing the tuition fees so that additional and experienced teachers may be provided.

College Fees Should Be Increased. These faults last noticed, namely, employing as teachers men of indifferent skill and limited experience, who can be secured at a low salary, and upon whom we place work enough for double the number, can be remedied only by securing the means requisite to employ the best skill, matured by wide experience, and in number sufficient to thoroughly supervise and direct each student. Is the means now at hand? I think not. Experience has taught me that usually the colleges have provided as many and as expensive teachers as the dues paid will permit. Those who think differently are usually those without experience in the

financial affairs of dental colleges. This being true, what other remedy have you to offer? The best teaching talent *cannot* be secured in these days without competent remuneration—their number *cannot* be increased without the increased income. Let us provide the means. Let us relegate the undergraduate and the recent graduate teacher to where he belongs—to the world of experience—and give to those competent men who now teach a proper fee and secure others of talent and experience to assist them.

I therefore bespeak the effort of each individual in this Institute to a sufficient increase in tuition fees. I believe a united effort would convince all concerned that this can be done, and that it would be a step in advance of greater benefit than adding another year to the course. The foreign dental schools of prominence usually receive a fee of nearly $250 per term, and their expenses are less because they do not require the equipment for practical work which is so expensive, as their students receive that instruction under their preceptors to whom they are indentured. Why should we not profit by their example in this matter of tuition? At an early period in the history of dental education, when teachers, many of them engaged in teaching without money recompense because they deemed it a professional duty to instruct new men to meet the great need of dental service, and when students were not so numerous, the fees for tuition were placed at a nominal sum. It was all that was required at that time—the fault has been that they have not increased with the demands of the day, which compels larger outlay for competent dental instruction. The salary list of the really competent demonstrators who give the college the larger portion of their time in every college I have investigated is grossly inadequate and the position is not retained long by them and is used as a "pot boiler." This is a fault. The salary of the competent should be commensurate with a dignified position. Of the *incompetent* and inexperienced what shall I say? College men declare that they are unable to avoid their employment; that they cannot afford to pay the best men very well. Let us concede that this is true, and let us rapidly place ourselves in a position to afford the best, for of all departments of dental teaching the demonstrator is the one who should without exception be at the front rank.

At the last annual meeting of this institute Dr. E. T. Darby made a statement which created something of a sensation. He said, re-

ferring to the earlier dental college training, *"We made better dentists then than now."* He referred to the practical work then and now. The observation was made by a careful man who had no remote idea of stating anything but what experience and observation warranted. I think the statement true and that the older men of this association must subscribe to Dr. Darby's opinion. Personal observation and contact has taught the writer the utter helplessness of the majority of students who have come to the end of their college course—when confronted with practical cases a little out of the ordinary. What has caused this condition? Is it not caused by some of the faults above noted? In early days, when the student came up for graduation at the end of one or two years, he almost invariably came to the college with practical experience, gained from a private pupilage usually, and this advancement has not found its prototype in college training. The college has failed to "make good" in this matter. Students are herded together, known by a number. The shepherds are too few and many of them incompetent, and that personal supervision which is so necessary in a calling which is so largely mechanical and which requires personal and repeated direction for the attainment of manipulative dexterity has not been afforded. The question is certainly a vital one. If the college training in any department is sending out a product inferior to that of past years, it is certainly time to make a reckoning and find the fault. Is the practical instruction deficient? the theoretic curriculum too burdened? or the students of such inferior moulds that the finished product is misshapen? These are questions for this Institute; they will not be settled elsewhere.—*Items.*

DIET, DENTURES AND DISPOSITION. By B. J. Cigrand, B.S., M.S., D.D.S., Chicago. Read before the Chicago Odontographic Society, April 20, 1903. Illustrated by 60 views. The title of the paper may seem to indicate that the subject matter would be more appropriate from the pen of a physician, but the article covers ground contained within the limits of the science of dentistry. The dentist has equal rights with the physician or surgeon in operations or treatments within the oral cavity, and if we were to practice our profession to the fullest latitude of the definition of dentistry we would be likely to give attention to parts distant from the teeth. But it is my purpose to remain close to our occupation, and show how

we as dentists can direct and possibly educate the public up to an appreciation of the science of dentistry.

If we are supposed to be concerned with matters pertaining to the teeth I cannot see why we should not look after the diet of our patients, for what comes in closer touch with our work than food? That our teeth depend largely upon our mental and physical condition none will at this late period of the nineteenth century deny, and that, in turn, our mental and physical conditions are most decidedly affected by our diet can be demonstrated; and in this chain of dependence we recognize that all organs or parts of organs are influenced by the surrounding physiological circumstances, and these are acted upon primarily by the food we eat.

In the living organism the forces of destruction and renovation are constantly at work. Every action, be it mental or physical, necessitates destruction, and the tissue or part which has been affected must of necessity be restored or the waste will be greater than the repair, which means early decay and death. A wise arrangement in nature provides for this loss and rebuilds the broken-down tissues of the body continually. By this process of animal restoration, so far as weight is concerned, the body might be renewed several times in a week; but all our food is not nutriment to the human frame. A considerable portion of it is innutritious, and though useful in various processes, is not destined to repair the losses of the general system. To meet these constant chemical changes two materials are essential, food and air; and during the first half of our lives the repair somewhat exceeds the waste, and our beings grow larger, stronger and heavier; while in the latter portion the opposite force seems to govern our destinies.

Nutrition and repair have come to mean the same, and both are symbols of life. The rapidity with which these changes are carried on is far greater than is usually supposed. Paley claims that the entire living organism is renewed in seven years, but recent investigation has cast aside the mystical figure seven and substituted the word "time." The time requisite to renew the body is placed at something less than one year, but it would be absurd to fix a certain duration of time, since renovation of the body depends upon many factors, among which are age, occupation and climate. Changes take place more rapidly in the infant than in the aged, in the active than in the indolent, in warm climates than in cold, and the several

organs of the body and their respective secretions do not all suffer the same changes, nor are they effected in a like period of time.

The fluids and secretions are often and rapidly replaced; the epithelial lining of the alimentary tract is wasted and repaired several times in one day; the muscular tissues endure well the force of retrogradation, the bones are very fixed in their composition and undergo the differentiation slowly, while the dentin and enamel of the teeth suffer little after fully developed. It is in this latter truth that we are especially interested, for we find that destructive metamorphosis far exceeds the constructive metamorphosis, at least such seems to be the testimony borne out by the present as well as the rising generations. Since the teeth are, of all other parts of the body, the least repaired physiologically, it behooves us to ascertain how we can best induce a healthy and perfect growth of these most important organs.

We subsist on two classes of foods, one in a solid and the other in a liquid form, and both are essential to health and longevity. There are a few products of our soil which are especially adapted to support life and keep the body in a vigorous condition. Among the solids which are possessed of the requisite elements of the teeth are wheat and rice, and among the liquids we find milk and water. Now it is all-important that the teeth while yet in embryo shall receive nutriment calculated to assist in constructing their several earthy components, and this truth needs to be more clearly impressed on the minds of all who are concerned with their hygienic condition. The initial development of these organs begins in early embryonic life, and it must not be forgotten that the diet of the mother largely contributes to the welfare of the child's teeth. Her foods should be of a very wholesome nature, and especially impregnated with a sufficient quantity of phosphates and fluorids and carbonates, which enter largely into the formation of bones and teeth, and while nurturing the babe she should continue her diet of earthy constituents. The child subsequent to birth should be fed on foods of like character, and as he grows into youth a continued regard should be paid to the further use of foods freighted with elements which assist in forming perfect dentin and enamel. This diet must be continued throughout the period of dentition, if strong and effective tooth structure is to be developed. It might be kept up until the child is about twelve years of age, and excellent results would follow.

After the teeth have fully erupted our diet has but a passive influence on the dentin or enamel. When once fully developed they are freed from the epithelial layer, and when the crown has fully erupted it is completely separated from all vascular tissue, and is no longer dependent on the circulatory system; in consequence of which there can be no restoration of broken-down enamel tissue. It may be stated as a physiological maxim that "there can be no constructive metamorphosis where there is no blood supply," and since the enamel does not possess this agency of reproduction, its destiny is in the power of external forces.

The dentin is, however, in immediate touch with the circulation, as it envelops the dental pulp, and is supplied to a limited extent with vascularity; yet there is no capillary circulation within the texture of the dentin, and it, like the enamel, suffers waste and decay without receiving the aid of the restorative functions of the blood. Nature provides that, in the event of the enamel being worn down to such a degree as to disclose the dentin, the living pulp is protected from the abuse of the outer world by minute granulations of dentin deposited on the walls of the pulp chamber. These depositions of secondary dentin encroach upon the space occupied by the pulp, and if the formation of new dentin is stimulated by irritation of the dentinal tubuli, and the formative process continues sufficiently long, the entire pulp chamber becomes filled with calcic phosphates. But the broken-down dentin is never rebuilt at the point of destruction, the new formation being at the inner ends of the dentinal tubuli opposite to the wasting ends.

This irritation may be in the nature of cold or icy foods, such as ice cream, or may be caused by hot drinks or foods, which many people indulge in too freely. Foods which are considerably colder or warmer than the human system should be discarded, since they not only irritate the dental pulp but frequently crack the enamel prisms.

This is essentially an age of "white bread" and "extra fine flour," and it is therefore a period in which we are no longer partaking of anything like the same amount of bran that our ancestors did, and in consequence are deprived of the chemical element which husks contain, namely, flourine. It has been demonstrated that flourine occurs in nature in very small quantities, and the only natural channel by which it can find its way into the human body

is through the husks of grain, in which it exists in comparative abundance. People at present have a dislike for all silicious or gritty foods and are addicted to soft and succulent nutriments, which do not afford the teeth proper exercise, and the latter influence on the normality of the dental organs is of late attracting considerable attention. The teeth must be employed as instruments of mastication or there will be a systemic tendency toward their elimination, and if the circulatory system were in immediate communication with the enamel and dentin there would be a marked effort on the part of nature to make them rudimentary. Hence the husks of grain, or foods which require a considerable amount of chewing, exert a good influence on the teeth; and flour which does not contain some of the husk or its immediate layer fails to supply flourine to the growing dental germ, incurring feeble and imperfect health of the tooth structure.

Such is the direct or physiological influence of our diet on the dental organs, but food exerts an indirect or pathological influence which is fully as important for us to understand. As an instance of this indirect effect the disease known as dyspepsia affords a good example, showing how our diet may act as an exciting cause of dental caries, many people suffering from this ailment; and in this country the difficulty has become so prevalent that in Europe it is seldom known by any other name than the "Yankee disease." Patients afflicted with dyspepsia invariably present soft and imperfect enamel and dentin. The cause is traced to the acidity of the stomach, which is due to the diet being of a character which entirely exhausts the capacity of the gastric juice. The foods usually inducing this trouble are pies, cakes, candies and other favorites of a so-called "sweet mouth." These foods lie in the stomach for from three to four hours, and during this period fermentation sets in and acid is formed. The gastric juice contains a large quantity of hydrochloric acid, and the acid resulting from the food ferment adds to the acidity of the stomach. The patient generally suffers from water-brash, flatulency or ptysis, and by this eructation the acid of the stomach is forced into the mouth and there completely bathes the dental organs, whose outer armor cannot resist the action of acid, and the lime salts being dissolved, dental decay has been initiated.

Man's disposition is as much evidenced by the choice of his

foods as by the selection of his work. The two are practically one. The choice of his food is in perfect harmony with his physical and mental inclinations, and consequently the former is the energy with which he accomplishes the latter. Besides the character and outline of his teeth, their moving and occlusal surfaces indicate to a certainty the preferences of his foods. This is best studied in the lower animals, since they live in perfect naturalness and have not been disturbed by conventionalities. The sharp, pointed teeth of the canine family, with jaws that have simply the ginglimoid movement, proclaim to those who understand the text theorem of mastication that meat is their favorite sustainer. The flat and cuspless molars of the grain and cereal-eating animals state clearly the disposition of the animal. Comparative anatomy really forms the system construction of perfect knowledge of human anatomy. The temperaments of people in consequence have a strong resemblance if not relationship to animal disposition.

The law of harmony thus found in nature between the teeth and other physical characteristics requires due respect to size, shape, color and other qualities in an artificial denture in order that it shall correspond with other indications of temperament. In a recent article I arranged this table of temperaments:

The Motive Temperament.—To the ancients known as the muscular. Persons of this quality of body and mind are "human powers," strength and endurance their peculiar characteristics, constitutional powers and great muscular strength. Tall and angular, active, steady and firm. Facial contour, square, angular and high cheek bones. Complexion, dark and sallow. Quality of voice, strong and full of vibration. Nose, strong and usually Roman. Eyes, dark and piercing. Hair, dark, coarse and abundant. Fingers, long and knotty. Teeth, angular, three sharp cusps; appetite, inclined to eat liberally of meat. Favorable characteristics, energetic, persevering, executive and ambitious. Unfavorable characteristics, extreme in expression and often domineering. Example of type, old Roman. Comparative anatomy, the bulldog. Human example, Daniel Webster.

The Mental Temperament.—To the ancients known as the nervous. This might be called the sensitive, refined or brainy. External indication, well developed nervous system, studious and refined expression. Constitutional outline, full and graceful figure. Gen-

eral movements, quick, active, decided and restless. Facial contour, delicate, oval and finely cut. Complexion, abounding in grayish tint, lack of flush. Quality of voice, strong, clear, high-pitched and melodious. Nose, well developed, usually Grecian. Eyes, bright, expressive, usually gray or blue. Hair, not abundant, and fine in texture, usually brown. Fingers, long and thin. Teeth abounding in oval outlines, appetite inclined to the fruits. Favorable characteristics, refined, imaginative, scholarly and studious. Unfavorable characteristics, sensitive, aspiring and often eccentric. Example of type, American people. Comparative anatomy, the pointer. Human example, Longfellow.

The Sanguine Temperament.—To the ancients known as the plethoric. This might be called the sanguine, hyperemic or cardiac. External indications, flush and florid complexion. Constitutional outline, medium in height and lively, general movements active and easy. Facial contour, round, with full forehead. Complexion, florid and animated. Quality of voice, soft and clear. Nose, rather small, usually Grecian. Eyes, usually blue. Teeth, poor cusps, width predominating over length. Appetite, cereals. Fingers, medium in length and rounded. Favorable characteristics, mirthful, social and friendly. Unfavorable characteristics, passionate and high-tempered. Examples of type, Danes and Germans. Comparative anatomy, shepherd dog. Human example, John Adams.

The Lymphatic Temperament.—To the ancients known as the phlegmatic. This might be called stomachic or digestive. External indications, round and well-developed jaws. Constitutional outlines, fleshy and bulky, general movements slow and sluggish. Hair, coarse, straight and drab. Fingers, short, flabby and cold. Teeth, scarcely any cusps, wider and thicker than the sanguine. Appetite, succulent foods. Favorable characteristics, contented, agreeable and jolly. Unfavorable characteristics, sluggish, lazy and unenergetic. Example of type, Esquimaux. Comparative anatomy, swine. Human example, Henry the Eighth of England.

Strange as it may seem, the motive temperament is the one most changed after depending upon artificial dentures. I have arrived at this conclusion after a most careful examination. The deductions I have made are based on answers furnished me by people wearing full sets of artificial teeth. I have not projected a theory, and then gone forth to find material to prove it, but have for years

collected all possible notes, observed closely, and compared freely before I permitted myself to form a conclusion. That change in diet of necessity changes disposition, if not even the temperament, I am thoroughly satisfied. Example of this we have at our command from comparative anatomy. The dog desires meat as a food. If this is denied him and he is fed on bread and cereal food stuffs the dog propensities are shortly changed, and if the food first given him is changed for a period of years his entire animal disposition is recreated. If you again substitute for the cereal foods the meat diet, he will in several months return to his original inclination, and instead of being merely watchful and alert, become ugly, disagreeable, and even savage. And what is true of the dog is true of the feline tribe and other animal classes.

To arrive at some definite knowledge as to what change takes place in people of the motive temperament, who, like the dog, are inclined to meat-eating, I have studiously inquired into this feature of things. For some four years I have made it a practice to inquire of such of my patrons as wear full sets of artificial teeth (whether made by myself or not) the following questions: 1. In what particular has the wearing of artificial dentures affected the choice of your foods? 2. Have you observed that your disposition has in any sense been influenced by their use? 3. Have they interfered or aided you in your vocation? If so, state clearly how and why. 4. Mention any other features relative to your artificial dentures which appeal to you in connection with your change in diet or disposition. From this source I have gained many interesting points. Nearly all of these patrons replied that they did not eat as much meat as previous to the loss of their natural teeth, that they observed their sleep was sounder, and that they were less nervous. One attorney wrote me, saying: "Before I had my teeth extracted I suffered for years with insomnia, and since I am wearing artificial substitutes my sleep is splendid. I presume I must have been suffering from some form or other of neuralgia, for my teeth never gave me much pain, and the dentist who extracted them did so because the roots were not sufficiently strong to warrant bridgework." Now I am convinced that this attorney was cured from insomnia, not because of any disturbing tooth or annoying roots, but primarily from a change of diet, he admitting to me that he was a heavy meat eater before he lost his teeth. The change in diet from meat to fruit and cereals was mak-

ing it possible for his stomach and alimentary tract to rest and recuperate from the heavy strain of cooked meats. Besides, the reflex action of an overworked stomach acted most decisively on the brain, and insomnia developed simply because of a repetition of mental disturbances. Furthermore, his life work being largely indoor and clerical, engaging the mental capacities and not having sufficient exercise to exhaust this meat energy, he was destroying his nervous system by indiscreet choice of food.

That is one of the sins of city life. We eat more meat than our physical economy requires. In consequence a variety of mental and oral disturbances follow. People who eat an abundance of meat must indulge in vigorous bodily labor or they will suffer from uric acid absorption and possibly inaugurate pyorrhea alveolaris.

Many writers define a motive or meat-eating temperament as the bilious temperament. This is a mistake, since biliousness is nothing more than a disturbed liver, and this ailment can befall any one of the four temperaments. Biliousness is a symptom of disease, but cannot under any circumstances be the symbol of a predominating quality of mind or body. This is what a temperament is, or it is nothing. It is a historic fact that General George Washington's disposition was markedly changed after depending on artificial teeth, poorly constructed as they were, for his life and energy. He was fond of meats, and after the loss of his teeth was compelled to initiate a new diet. In his writings he tells us that even battles were delayed because of his indisposition, which was invariably an acute attack of dyspepsia. Repetitions of these attacks manifested themselves when he was President of the United States, and the strong, determined and courageous Washington of early Revolutionary times was changed into one of conservative, quiet and indisposed temperament. Tuckerman says: "We do not know how much we lost because of ill-fitting dentures which Washington was compelled to wear. His hearty appetite was gone and a most satisfied mood came within his being."

The mental temperament is also changed when depending upon artificial teeth, not so much because of a change of diet as because of a disturbance of nerve centers, since in the mental temperament nature has really made a person into a bundle of nerves. The very presence of a lower or upper denture has an irritating effect upon the entire being of that person. A number of people who are of

this disposition wrote me remarkable deductions. A prominent attorney of this city says: "I am naturally nervous, and although my teeth give me no pain and rest comfortable, and are satisfying in every particular, they interfere with my thought. When I stand before a jury, fired to a point of sweeping conviction, my mind is occupied in the dual performance of speaking to my auditors and thinking of my teeth." So in this temperament the nerves, not the alimentary tract, are disturbed. I will also recite to you an incident which occurred in my office some time since, which portrays a remarkable condition arising from the loss of teeth. In fact, I believe that the loss of teeth, which necessitates the severance of all the nerve centers connecting the roots, must of necessity change the physical aptitude in these nerves in the brain. The amputation of upwards of sixty nerve fibres, one for each respective root of the thirty-two teeth, necessitates the trunk lines to become dormant, and this certainly affects the nerves of the head and face. I have had patients tell me that on the appearance of new fruit, such as apples, they would intuitively bite into them, forgetting their artificial dentures. This simply goes to corroborate what Steele says in his text-book physiology, that the brain never fully recovers from the loss or severance of any nerve fiber. This he clearly exemplifies by the bold knight who, after having lost his left arm, in a heated moment of excitement let go of the reins with his right, expecting to grasp them with his left.

Another answer came from a violinist of considerable note, and contained a statement which greatly surprised me. He is a gentleman of about forty-seven years, and has devoted his entire life to violin harmony. Some four years ago he was obliged to have his natural teeth extracted, necessitating artificial substitutes. He observed that his musical disposition was interfered with. Strange as it may seem, he noticed that his musical ear was less certain regarding delicate notes. He could not account for the loss of this important faculty, and he insisted that it was due to the artificial dentures—at any rate, subsequent to the loss of his natural teeth his distinguishing talent was lessened. He called a number of times and we had interesting interviews, though could not arrive at any conclusion. I called at his home and had the pleasure of hearing him play, but I could make no deduction. Just before taking leave he chanced to remark that when he was rendering fine or high pitch

notes on the E string he used to allow his chin to rest firmly on the trunk of the violin. Beyond this he could say nothing, except that the artificial teeth were interfering with his musical genius. The statement at first amused me, but after some few days of meditation I was impressed with the possibility of the jaw and the teeth acting as attributes to the auditory nerve. After reading up the regional anatomy of the ear and acquainting myself somewhat with the text elements of hearing, I felt inclined to accept the theory that the eustachian tube rendered a function in this particular. In fact, recent discoveries along the line of oral aid to hearing induced me to believe that the eustachian tube was responsible for many sound registrations in people suffering from deafness. Still, how could the violinist suffer the loss of his distinguishing talent when the eustachian tube and the surrounding muscles were unharmed? Finally the solution dawned. The natural teeth are a splendid example of gomphosis. They are of bony or ivory texture set into a bone also of ivory texture. When the violinist rests his chin or mandible on the violin the tone vibrations travel readily through the inferior maxilla, conducting the sounds through the inferior to the superior dental organs and thence to the bones of the head surrounding the auditory nerve. I then experimented with two violinists who still possessed natural occlusion, and placed unvulcanized rubber (a non-conductor of sound) between the teeth. Both observed a lessening of distinguishing power. This clearly demonstrated that in the case of playing the vibrating musical instrument, the violin, the teeth act as a sound transmitter and are directly responsible for vibratory registrations in the brain. I am unable to say how the natural teeth affect or assist in the rendering of music on other instruments which are not directly played by the aid of the mouth, but I am satisfied beyond a doubt that in the case of violin music, where the notes are not ready-made as in the piano and organ, the natural teeth play an important part.

In a paper before the Hayden Dental Society in 1897 I said: "The greatest possible good will result from an investigation of dietetics and dentures; the study of dietetics should be a part of the dental student's curriculum, in order that he may learn of the influence of diet on the teeth." If we are to be practitioners of dental surgery it is within our sphere to direct our patrons concerning their diet; we can do more for humanity by teaching them the purpose of preven-

tion than by giving them the purpose of the cure. I believe the old saw should read, "A grain of prevention is worth ten pounds of cure."

The nation in which we live does not fully appreciate the underlying principles of the laws of proper diet. In no land under the sun is there such utter disregard of the standing resolutions of good health in regard to diet as in the United States. The banquet boards throughout our country give evidence of gross violations of every tenet of physiology. In fact, the character as well as the manner in which most of the prandial is served stamps this epochal day in civilization little short of barbaric, and I am not so sure but that if we observed the dietary regulations of the animal kingdom we might not return to the ancient records of longevity.

The annual death rate from a variety of diseases inaugurated by dietetics is ten-fold greater in this country than in any war, not excepting the Rebellion. If the cabinet contained a secretary of health, and the general government at Washington inaugurated a trained service of dental and medical specialists, a department calculated to direct our people in the choice of their foods in the changing seasons, and studied consumption, pyorrhea alveolaris and other ravaging diseases due primarily to indigestion or ignorant choice of foods, we would grow strong and athletic as the Romans of old. For we must appreciate the fact that no nation has greater fortitude than she has strength stored in her soldiery. The recent war with Spain clearly demonstrates the low par of the American in his physical being as compared with that same American who enlisted in '61. And why is this? Careful study leads us to the answer. The present population of the United States is surging toward the cities, where they grow up confined in their abodes and restricted in their appetites; the corruption of the air completely changing their physical being; the pollution of the waters and the impure foods and vegetables acting as confederates in this siege of destruction. The result was, when the war was declared the bulk of the enlisted boys came from the precincts of overcrowded and congested cities, while in the Civil War the boys rushed forth from the farms, hardy, strong, vigorous and athletic. I need not emphasize to you the great army of boys who were refused enlistment in the war with Spain. Thousands of them were cast aside because of their imperfect dental organs, of these 88 per cent coming from the cities. This aids in

corroborating that not only was their physical being below weight and measurement, but their life of haste, hurry and hustle, together with the five-minute lunches, had destroyed their powers of mastication.

It is evident that the medical fraternity would oppose a curriculum in dental colleges calculated to teach dietetics to dental students, since this would foreshadow a tendency of encroachment on their accepted province, but if we are truly awake to the purpose of our calling a criticism of this character will not dampen our ardor to reach out and take possession of such arts or science as will give promise of firm foundation or better superstructure. The profession in the past has made similar advances and met like rebuffs, and in consequence donated features to both surgery and medicine meriting the praise of those who first opposed and oppressed departure. The same will be true of the subject of diet, since we can readily convince all that as guardians of Solomon's "Milestones of Life" we are intensely concerned in the disposition of our patients and especially interested in the foods they accept. This theme belongs to us, we must not flinch nor retreat; we have the legal right, since it is integral ground, and this pioneer task we can accomplish—and if we are branded as usurpers, let us remember that usurpation of power is no greater a crime than neglect of duty.—*Review.*

OSTEOMYELITIS: A CASE IN PRACTICE. By Dr. H. B. Hickman, Philadelphia. Read before the Philadelphia Academy of Stomatology, Oct. 27, 1903. The case I wish to bring before you is that of a man, aged forty-three years, weighing one hundred and sixty pounds, five feet six inches tall, with no apparent evidence of any specific disease, although his mother died of some form of tuberculosis. Up to within six months of the time when this second bicuspid started to give trouble he was in fairly good health, being manager of a large business and with a superabundance of energy, although he had not taken a vacation for eighteen years. His wife had been in bed with an incurable disease for over a year; he was needed abroad to attend to very important business, but his wife would not consent to his going away even for a short stay, and since his wife had been sick he had been forced to give up his only recreation, music. The strain at home and office, with no rest, began to manifest itself by his being very nervous, having lost

appetite, being easily fatigued and anemic. I was able to watch the change in the condition of this man, because he was a very intimate friend, and also because his teeth gave him a great deal of annoyance during this period, but he would not listen to advice as to rest, tonics, etc.

This brings us to the time he called at the office with the right lower second bicuspid very sore, aching, and slightly loose. I diagnosed pericementitis caused by a putrescent pulp. After chilling the tooth with chlorid of ethyl spray, which relieved the pain, I opened through a small amalgam filling and found the pulp-chamber and canal filled with gutta-percha; then the patient remembered that it had been treated and filled ten or fifteen years before. After removing the root-canal filling I was able to pass a broach through the apical foramen, which opening gave only momentary relief. I prescribed a laxative and anodyne, with the usual treatment for pericementitis, feeling sure he would be better the next morning.

On the day following he returned to the office. The tooth had ached continuously and he wished it extracted, which was very nicely done under nitrous oxid gas by a specialist, who cleansed the mouth with an antiseptic solution both before and after extracting. I examined the root and found it slightly exostosed. The socket was packed with phenol sodique and cotton. The pain returned before he reached home, and his physician, who had been summoned, could not relieve him. His physician wished him to go to bed there and then, but he suffered so much more when lying down that he slept in a reclining chair.

I saw him at his home the following day at noon, and found that a saturated solution of carbolic acid on cotton gave him relief for eight hours, when the pain returned with renewed force. This condition continued for ten days, the socket being packed every eight hours with carbolic acid, at the same time using fifty per cent phenol sodique as a mouth-wash. Sulphate of zinc was tried in the socket with only partial relief. By this time the patient was in bed with a temperature varying from 102° to 104°. The legs and body were covered with pustules resembling chicken-pox, which disease the physician led the family to believe he had.

At this time there was some swelling or puffiness of the gum tissue around the socket, which had not filled up very much. The temperature was about 103° to 104°. There were rigors alternating with flashes of heat, followed by copious sweats, which had rather

a disagreeable odor. He had an exceedingly irritating cough, especially when he talked or became the least excited. At the end of six weeks, a mere shadow of his former self, he died, having been delirious the greater part of the last five weeks. According to one physician it was called general nervous collapse, but others thought it was septic meningitis that caused his death, superinduced by the osteomyelitis and the very low state of his health.—*International.*

LIMITATION OF EXTENSION FOR PREVENTION. By G. V. Black, M.D., D.D.S., Sc.D., LL.D., Chicago. The forms of the areas of liability to decay are different in the molars and bicuspids from the forms presented in the incisors and cuspids, because of the differences in the forms of proximal surfaces of these teeth, but the essential character of the areas is the same in all, so that they are really much alike. The area of liability to decay upon the proximal surfaces of all of the teeth is to the gingival of the contact point. In the bicuspids and molars its occlusal border line passes through or just gingival of the contact point horizontally and reaches slightly out into the buccal and lingual embrasures. It then rounds to the gingival. The buccal border line passes diagonally to the buccal and gingival to the free border of the gum, and the lingual border line passes diagonally to the lingual and gingival to the free border of the gum. The gingival border line follows the free border of the gum from buccal to lingual, enclosing the area. In the incisors and cuspids the form of the area of liability is different, because of the triangular form of their proximal surfaces. Towards the incisal it forms a somewhat rounded angle at the contact point and stretches away to the buccal and lingual and gingival along the opening of the embrasures to the free border of the gum, and is bounded to the gingival by the position of the free border of the gum, enclosing a triangular space. The area enclosed by these lines is the proximal area of liability to decay. The area of tooth surface just outside of these boundary lines, or along the angles of the teeth, is immune to decay in all persons who are making free use of their teeth in mastication. We rarely see decay beginning upon the mesio-buccal or disto-buccal angles of the teeth, and it almost never occurs upon the corresponding lingual angles. The reason is that in the mastication of food it is forced through the embrasures in such a manner

as to sweep these angles clean. It is for this reason that they are immune. When I speak of immune areas of the surfaces of teeth it must be understood that the immunity meant is due to position entirely. The tissue of the tooth upon these areas would be just as liable to attack as that of the areas of liability if their relative positions were changed. Stated in shorter terms: The proximal area of liability to decay is bounded to the occlusal by the proximal contact point, to the buccal or labial and lingual by the opening of the embrasures to the excursions of food during mastication, and to the gingival by the position of the margin of the healthy gum septum.

This requires that the operator make a study of each individual proximal surface involved in decay, determine the boundaries of its area of liability to decay, and that in the preparation of the cavity the whole of the area of liability be included within the cavity outline, together with such area of the occlusal surface in bicuspids and molars as may be necessary to give convenience in operating and stability to the filling. If present decay only be removed, the cavity lines not being extended as described, decay will recur about the margins of the filling, causing failure. The provisions for maintaining the health of the gum septum should not be overlooked. Caries never makes a beginning on a portion of the tooth surface covered by a healthy gum septum or gum margin. All such portions are strictly immune. A margin of a filling so laid that it will be continuously protected by healthy gum tissue is as safe as if laid upon a surface fully exposed to the friction of mastication. Therefore the preservation of the health of the septum of the gum which normally fills the interproximal space to the contact point is one of the important factors in treatment. It therefore follows logically that in the preparation of these cavities they must, in order to be curative, be cut so far into the embrasures both to the buccal and to the lingual that the excursions of food in the act of mastication will sweep their marginal lines and keep them constantly cleaned, and the gingival margin must be so laid that it will be covered by the gum septum. Then if the form of the proximal surface, and especially of the contact point, is so made that it will protect this gum septum, and sufficiently prominent to preserve the full mesio-distal breadth of the tooth, the permanence of the filling made with technical skill is assured. The cutting of cavities to

these lines is termed extension for prevention. It applies to all proximal cavities.

Study Conditions Carefully.—For development of the highest skill in carrying out these procedures the conditions should be carefully studied from mouth to mouth in those cases presented in practice. In persons belonging to highly susceptible families, and who present a number of beginning decays, close examination will show, when the surfaces are cleaned and dried, whitened areas of enamel leading away from the central area of penetration to the buccal (or labial) and to the lingual close to the margin of the gum. This is really incipient decay, and it should be carefully noted and the form of the area studied with reference to the proximating teeth and to the marginal edge of the gum tissue. The directions taken by food in its excursions over the neighboring parts during mastication and its effect in cleaning the parts should receive especial attention. By this kind of study carried on from mouth to mouth the operator will learn to appreciate the areas of the surfaces of the teeth liable to decay and become able to lay the margins of cavities on lines of comparative immunity without cutting excessively.

By this plan of study it is found that the areas of liability of proximal surfaces broaden out to the buccal or labial, and to the lingual along the line of the free margin of the gum or near it. Therefore by extending the cavity so as to include these points within its marginal lines, squaring out the labio-gingival angle and the linguo-gingival angle in incisors and cuspids, and in bicuspids and molars, in addition to squaring out the buccal and linguo-gingival angles, cutting the buccal and lingual walls parallel from the occlusal surface until the gum margin is reached, and the gingival margin straight from buccal to lingual, these areas of liability to the recurrence of decay will be included in the cavity. At the same time the form of the cavity will be greatly improved in the physical sense, so that the filling will be more quickly and easily made, facilitating accuracy in the operative procedure.

Studies of this nature will after some time enable the operator to form a better estimate of the necessity for extension in particular cases. As a general rule it will be found that as persons grow older and the intensity of susceptibility has diminished, and especially in those in whom the tendency to caries has never been great, the areas of liability are comparatively smaller. In these the extension required will be correspondingly less.

These processes are carried out for their curative and prophylactic value. Much simpler fillings, in the technical sense, may be made and have been made in these cavities in the past, but have been found lacking in prophylactic value. Decay is continually recurring about the margins of the fillings, whenever these are involved in habitual uncleanliness, and they are soon undermined and destroyed. Extension for prevention intelligently adapted to the conditions and skillfully carried out has been found an effective remedy.

Extension Limited.—In the use of extension for prevention there is no call for extension around the angles of the teeth onto either buccal, labial or lingual surfaces. Objection has been made in some journal articles and society discussions that cavities had to be cut inordinately large in order to comply with the requirements, especially in the front teeth. This is from a misunderstanding of what is meant. In the front teeth there should be no cutting over onto the labial surface, nor should there be any considerable show of old fillings for the purpose of satisfying the rules of extension for prevention. Decay seldom begins on the angles of any of the teeth, and it is especially rare in the angles of the incisors and cuspids. When cavities in these are so cut that the margins approach the angles sufficiently to free them well from near contact with the proximating tooth, extension for prevention is satisfied as a general rule. An incisor should never be cut onto the labial for the purpose of extension for prevention in the preparation of a cavity. It is only when decay has extended so as to undermine and practically destroy a portion of the enamel of the labial surface that it should be cut away. In these teeth the necessities for extension for prevention relate almost exclusively to broadening the cavity to the labio-gingival and linguo-gingival, or squaring out the ordinary rounded form of the gingival wall and making the labial and lingual walls straight from near the incisal angle to the labio-gingival and linguo-gingival angles. This was distinctly pointed out and illustrated in my articles of 1891 in the *Cosmos.* The same rules apply to bicuspids and molars, with this difference: Incisor cavities must be filled from the labial or lingual because they are not cut out to the incisal; proximal cavities in bicuspids and molars are cut out to the occlusal and must be filled from the occlusal. Therefore, for convenience in operating, and in order that the filling can with certainty be well

made, it is necessary that the cavity be as broad bucco-lingually at the occlusal as at the gingival. Therefore any extension made at the gingival toward the buccal or lingual must be carried out to the occlusal. This makes cavities somewhat larger in these surfaces, but in no case is it necessary to extend to the angle of the tooth, much less beyond it, in satisfying the demands of extension for prevention. Large fillings extending far out onto buccal or labial surfaces should be made only when demanded by extension of decay.—*Summary.*

ONE STEP IN THE EDUCATION OF PATIENTS. By Frank L. Platt, D.D.S., San Francisco. Read before the California State Dental Association, June, 1903. It is true, generally speaking, that not more than one out of fifty of our patients has a reasonably good idea of the actual condition of his teeth; not alone as to the number of cavities they may contain or their condition regarded from the standpoint of prophylaxis, but their condition as regards general usefulness for the purposes nature intended them to subserve. The majority of patients think the loss of one or two teeth a trivial matter, outside the pain and discomfort involved in their extraction, and but few realize that the loss of even one tooth may destroy to a very considerable extent the usefulness of an entire denture.

A perfect set of teeth is rarely seen, that is, a set of teeth free from caries or the evidence of previous decay as betrayed by crowns and fillings, one in which all the teeth are in normal position, presenting not alone a pleasing appearance, but also a perfect occlusion, and fully meeting the requirements of mastication, insalivation and enunciation. That such a condition is rare is not surprising considering the prevalence of dental caries and the customary habits of neglect, but a set of teeth, even showing many fillings and other evidences of dental art, that occludes properly and fulfills its normal functions is rarely seen.

It is rare also to find patients, even those who enjoy regular periodical dental service, whose teeth have been restored as far as possible to a normal condition. All the cavities may have been filled, all the hopeless teeth may have been extracted, and generally speaking the teeth may have been put in fairly good condition, but there will be found in almost every mouth spaces caused by the loss of one or more teeth, or by the separation of some of the teeth, due to the loss

of others, and fillings and crowns which restore neither approximal contact nor occlusion are by no means uncommon.

Of all those conditions and their more or less evil consequences the patient may be and generally is utterly ignorant. They have been ignored by one dentist after another and no attempt has been made to put the teeth in really first-class condition. An occasional crown or bridge is not sufficient, and but palliates an evil which should be wholly corrected, and it is here that education is mostly needed, not always by the patient alone, but frequently by the dentist himself.

To accomplish the desired end, and to logically acquaint the patient with the true state of his teeth, something more than the expression of opinion or the quotation of the dental authorities on the subjects involved is required, and nothing is so good for the purpose as articulated models of the patient's teeth. It is the work of but a few minutes to make modeling compound impressions, for absolute accuracy is not required and it is unnecessary to use plaster, and run plaster models. While these are setting a filling may be inserted, calculus removed, or any initial operation demanded by the case may be performed. Before the patient leaves the office, or if the first sitting has been for examination only, before the next sitting commences, he may be shown the articulated models of his teeth, and nothing else will so convince him of their true condition and the necessity for intelligent service. He may be shown in this way that the chief function of his teeth has been to punch occasional holes in the pieces of beefsteak he has fondly imagined he has chewed, and that so far as actual mastication and insalivation are concerned, they are unknown factors in his digestive process. If he is a dyspeptic, as is not infrequently the case, the cause of his gastric unhappiness may be clearly demonstrated. He or she may also be shown where personal appearance may be greatly improved, where sunken cheeks may be given the contour of blooming youth, flat lips given new character in their expression, and the whole being of the individual changed.

When the work is finished, take two more impressions and show him models of the completed case. The comparison of these with the models first made will complete an object lesson of value and interest.

If we, as modern, up-to-date, conscientious practitioners of dentistry, are to do our whole duty by our patients we must not simply place a filling here, a bridge there and a crown somewhere else, but we must restore as far as possible every function of the teeth, and we

must not neglect to intelligently acquaint our patients with the necessity for each operation and the fundamental principles governing its performance. We must restore approximal contact with well contoured crowns or fillings, thus retaining the normal position of the teeth and protecting from the intrusion of particles of food the gum in the interproximal space; we must replace lost teeth with proper artificial substitutes, bridges or plates, each in its indicated place, not leaving a dozen teeth to perform the functions of thirty-two, and we must more fully than is customary look into the general health of our patients, as it is related to the condition of their teeth, and render nature every aid in our power to establish normal conditions. With such services intelligently performed a generation of patients will rise up to call us blessed.—*Gazette.*

REPLANTATION AND ITS USES—REPORT OF A PECULIAR CASE. By Otto E. Inglis, D.D.S., Philadelphia. Replantation has for a long time been a valued means for the relief of certain conditions of roots which cannot be thoroughly treated while the teeth are *in situ,* owing to the inherent difficulties of proper appreciation of the extent and character of lesions, of approach to the seat of disease by way of the canal, of hemorrhage from the pericemental and alveolar tissue, and lack of resistance of the same to filling materials introduced against them. As a result of these difficulties therapeutics may be but indifferently applied, or filling material may be placed in such a manner as either to underfill or overfill openings in the root.

In apical abscess, incurable by ordinary methods, the root end may be amputated after correct root-filling to the point at which the root is to be amputated. This method is to be preferred to replantation, as it eliminates the necessity for extraction and the splinting of the tooth after replantation, and is ordinarily altogether an operation of more simple character. Moreover, the subsequent possible resorption of the root is avoided. The same may be said for cases of perforation near the apex of the root, when these do not yield to ordinary treatment, and are productive of either non-septic or septic sequelæ.

Cases of lateral perforation at about the middle third of the root, or into bifurcations of multirooted teeth, of teeth having dowels of crowns thrust through the opening made through the side of the root, of teeth elongated as the result of pericemental abscess or partial dis-

location, or when badly affected by pyorrhea alveolaris which has had its origin from marginal gingival infection, are the ones most strongly indicating the necessity for an extraction and replantation. In making a diagnosis the X-ray radiograph will be the most useful means in cases in which covering fillings or crowns would have to be removed prior to otherwise making a clear diagnosis.

Granting the necessity for the operation, the mouth is to be sterilized, the tooth extracted with care to avoid the fracture of the cervical enamel, and placed in a strong germicide. The alveolus is to be curetted at diseased points and packed with a tampon saturated with a strong solution of phenol sodique. The tooth is then removed from the antiseptic, the root apex removed slightly, the canal thoroughly opened, sterilized with a strong and rapidly acting germicide, and thoroughly filled with gutta-percha. In some parts zinc phosphate made antiseptic may be used as a base for a metal filling. The apex of the root-canal may be filled with gutta-percha or with gold. A perforation is to be enlarged to include any necrotic area, and accurately filled in like manner. A dowel is to be dressed off and the necrotic area removed, together with enough pin to enable a gold filling to be anchored. The fillings are finished, and the tooth is returned to the antiseptic for a time. All being in readiness, the tampon is removed from the alveolus, the tooth inserted, and a previously prepared metal splint is attached with cement to hold the teeth in proper relation. In a few weeks the tooth should be firmly attached, when the splint may be removed.

The luxation of teeth by accident, such as a blow, or sometimes in extraction, either a second or the wrong tooth being extracted, may be repaired by replantation conducted upon the lines laid down.

A case peculiar in some respects occurred in the clinic of the Philadelphia Dental College. Mr. L., one of the students, had a first bicuspid presenting evidences of fracture between the cusps. The buccal segment of the crown was so loose, and a hasty examination so strongly suggested an oblique fracture extending to the buccal cementum, that the extraction of this portion was advised. Post-extraction examination demonstrated that an error had been made, and that the line of fracture had exactly divided the two roots at the bifurcation. Each root therefore had attached to it one coronal segment. The roots were not long, and the question was reduced to the crowning of the remaining portion of the tooth, complete extrac-

tion, or replanation of the extracted root. The last was advised as offering the best chance, and the operation was creditably done by Mr. B., one of the senior students. After replantation a gold band was cemented about the split crown, and held the segments in firm apposition. The mouth was kept carefully sterilized, and after some five weeks the band was removed and the replanted portion found to be firm. A hollow gold crown was prepared, and when ready the segments of the crown were gently wedged apart with an instrument and soft cement worked into the joint; the crown was then set. When last seen this tooth was apparently performing all the proper normal functions.

It is to be remembered that all plantations are apt to be followed by resorption of the root. This is apparently least certain in replantations. Perhaps this is due to the more normal relations of a tooth to its own alveolus than to a strange one. The fact, however, does not prevent the occurrence of marked resorption in some cases. The operation should therefore be a last resort only, and as such it is admirable.—*Stomatologist.*

To Extract Broken-Down Roots of Bicuspids and Laterals.—For extracting roots of lower bicuspids and upper laterals, where decay has extended to the process or beyond it, where the elevator could not be used, try a screw and you will be surprised at the result. Wash debris out of the root, drill slightly into the sound portion, following the canal; put in your screw tightly, then extract by grasping the screw with narrow-beaked root-forceps, giving a straight pull; do not luxate.—G. R. Gard, *Summary.*

A Rank Term.—"Cleaning teeth" is a beastly term; it should be relegated to oblivion. Suppose a patient should apply to the otologist to have his ears "cleaned," or to the rhinologist to have his nose "cleaned," what might not happen, especially if the doctor happened to be the bigger man? But the dental patient is not to blame, and this fact should make the would-be offended dentists considerate indeed. We have advised, recommended, charged for "cleaning teeth" for a century; we have educated the patient beyond the possibility of "Lest we forget," and like good chickens this and kindred terms naturally come daily home to roost. In the interest of reform and the habitual use of befitting terms, let us see to it that the patient, by means of brush, powder, washes, silk and rubber bands, disposes of all the dental refuse before coming to the office, leaving for us the purely professional task of "removing salivary and other deposits," "treating mechanically and medicinally the gums," "putting teeth and conjoined parts in a healthful condition." By all means let us quickly get out of our daily vocabulary terms that best become the dental scavenger.—*Dental Office and Laboratory.*

The Dental Digest.

PUBLISHED THE LAST WEEK OF EVERY MONTH

At 2231 Prairie Avenue, Chicago,

Where All Communications Should be Addressed.

Editorial.

THE ETHICS OF SPECIALISM AND THE PROFESSIONAL SPIRIT.

A reader of the *Dental Review* asks, "Is it ethical for a dentist to announce a specialty on his business card," and intimates that the code of ethics of the National Dental Association forbids calling attention to special kinds of work. The editor of the *Review* takes the correct position that the code does not forbid an announcement on cards or stationery that a man's practice is limited to a certain specialty, but that this section of the code was framed to prevent general practitioners calling attention to special methods of their own, thereby implying superiority in that respect over others. The editor also questions the propriety of a man announcing a specialty while still in general practice.

Commenting on this the editor of *Items of Interest* says, "We might go further than this and say that it is equally questionable to announce that one is a dentist. Why should cards or stationery carry anything besides the name and address? Manifestly to announce one's calling, which is to advertise. If the correspondent of the *Review* thinks it ethical to announce (or advertise) on a 'business' card that one is a dentist, why should he think it wrong to announce that one gives special attention to some branch?" The editor then comments on the subject of advertising, and shows that a self-respecting professional man cannot advertise. He closes by saying, "Why, then, should the code permit even the faintest semblance of advertising? Because after all dentistry in a way is a busi-

ness. The code therefore allows one to announce on cards and stationery the nature of his business. The dentist may state that he is a dentist; he may add that he is a specialist; he may give his address; he may print his office hours. Nothing in this lauds himself or his work. A card should not, however, carry a scale of prices on the back. This is undignified if not actually unethical."

It seems to us that this matter of ethics and advertising cannot be settled by any code or by any written law. The code of ethics is merely a statement of the principles that influence every professional man worthy to be called such, and those who framed it intended that it should be carried out in the spirit rather than in the letter. Of course the code will give needed information to those in doubt, but unless a man has the professional spirit within him no code can start him right or keep him straight. Perhaps few of us have ever stopped to realize what constitutes the difference between a profession and a trade. We are all aware that there is a certain social distinction, but few could account for its existence. Probably the majority would say that it is based on the educational culture which the professions are supposed to require of their members, but while this has its influence in creating the popular distinction it alone does not account for it. Merchants and men in other walks of life may be and often are better educated than the average dentist or physician, but they are not classed with professional men, and the same popular respect and prestige are not accorded to them. The true explanation is that dentistry, medicine and all branches of the healing art have a humanizing influence on those who practice them. The professional spirit influences the conduct even of those who would disavow it, and the professional pride and self-respect make the interests of the patient superior to those of the operator. The people at large are solicitous of their physical welfare and grateful to those who serve them in time of need. It is a sorry specimen of a professional man who does not have the utmost confidence and trust of his patients. That confidence is given more freely than it could be to any merchant or artisan with whom those patients had dealings. The very traits of character which inspire confidence make it impossible for the truly professional man to bring himself to the level of the tradesman. A merchant may advertise and keep the respect of the public, but a professional man may not. The difference is that one offers his wares and the other offers himself. A merchant in advertising legitimately

invites the public to buy his goods, but the professional man in advertising offers his skill, knowledge, judgment and honor, and no man of refinement can bring himself to proclaim in the public prints his own virtues. Engineers, architects, lawyers, ministers, artists, authors and others whose livelihood is dependent upon their personal ability do not advertise. How much less can those engaged in any branch of the healing art do so? The ethics of specialism, like general ethics, are governed by the professional spirit, and the more strongly a man is imbued with the latter the more nearly will he avoid the baneful breath of self-laudation, the taint of commercialism, and the better will he deserve the honorable regard given the true professional man.

Notices.

MUSKEGON DENTAL SOCIETY.

The Muskegon (Mich.) Dental Society held its annual meeting June 8, 1904, and the following officers were elected: President, G. M. Brown; Secretary and Treasurer, J. C. Nolen.

ERIE DENTAL SOCIETY.

The Erie Dental Society was organized at Erie, Pa., June 11, 1904, and the following officers were elected: President, M. C. Burgess; Secretary, J. H. Kelsey; Treasurer, C. R. Pollitt.

WARREN COUNTY DENTAL SOCIETY.

The Warren County Dental Society was organized at Monmouth, Ill., May 31, 1904, and the following officers were elected: President, D. H. Evey; Secretary and Treasurer, Paul Orth.

TOLEDO DENTAL SOCIETY.

The Toledo Dental Society held its annual meeting and banquet June 10, 1904, and elected the following officers: President, L. L. Sheffield; Vice-president, L. L. Zarbaugh; Secretary and Treasurer, H. B. Wellar.

OREGON STATE DENTAL ASSOCIATION.

The Oregon State Dental Association held its annual meeting at Portland, June 10, 1904, and elected the following officers: President, E. G. Clark; Vice-president, J. P. Harper; Secretary and Treasurer, A. C. Watson.

M'LEAN COUNTY DENTAL SOCIETY.

The McLean County Dental Society held its annual meeting at Bloomington, Ill., June 20, 1904, and elected the following officers: President, B. M. Van der Voort; Vice-president, J. W. Crigler; Secretary, J. S. Reece; Treasurer, M. D. Young; Executive Committee, O. J. Jarrett, J. W. Kasbeer, C. P. Holland.

UNIVERSITY OF MINNESOTA DENTAL ALUMNI.

The tentl. annual banquet of the Dental Alumni of the University of Minnesota was held at Minneapolis June 1, 1904, and the following officers were elected: President, A. B. Allen, St. Paul; Vice-president, W. A. Moore, St. Paul; Secretary and Treasurer, E. Z. Wanus, Minneapolis; Historian, Mary Hartzell, Minneapolis.

SOUTH DAKOTA STATE DENTAL SOCIETY.

The South Dakota Dental Society held its annual meeting at Aberdeen, June 9, 1904, and elected the following officers: President, R. J. Lamme, Mitchell; Vice-president, J. A. Robertson, Sisseton; Secretary, A. W. Fossum, Aberdeen; Treasurer, L. S. Straight, DeSmet.

SOUTHERN WISCONSIN DENTAL ASSOCIATION.

The Southern Wisconsin Dental Association held its annual meeting at Janesville, June 9, 1904, and elected the following officers: President, E. M. Carey, Beloit; 1st Vice-president, J. J. Wright, Milwaukee; 2d Vice-president, C. T. Pierce, Janesville; Secretary, C. W. Collver, Clinton; Treasurer, W. G. Hales, Mineral Point. The next meeting will be held at Racine.

INTERSTATE DENTAL FRATERNITY.

The Interstate Dental Fraternity will hold its annual meeting at St. Louis, Aug. 30, 1904. The business meeting will occur at 3 p. m. and will be followed by a banquet. The committee in charge is Dr. B. L. Thorpe, Chairman, E. E. Haverstick, and E. P. Dameron. Members may procure their banquet tickets in advance by remitting to Dr. E. E. Haverstick, 346 N. Boyle Av, St. Louis.

R. M. SANGER, National Secretary.

TENNESSEE STATE DENTAL ASSOCIATION.

The Tennessee State Dental Association held its annual meeting at Jackson, May 27, 1904, and elected the following officers: President, J. D. Towner, Memphis; 1st Vice-president, A. J. Cottrell, Knoxville; 2d Vice-president, A. A. McClanahan, Springfield; Recording Secretary, C. A. Sevier, Jackson; Corresponding Secretary, R. Boyd Bogle, Nashville; Treasurer, W. P. Sims, Nashville; Executive Committee, J. R. Beach, Clarksville; P. M. Joyner, Union City; A. R. Melendy, Nashville. The next meeting will be held at Nashville.

FLORIDA DENTAL ASSOCIATION.

The Florida Dental Association held its annual meeting at Jacksonville May 27, 1904, and elected the following officers: President, B. D. Beekman, Daytona; 1st Vice-president, R. P. Taylor, Jacksonville; 2d Vice-president, W. S. Taylor, Deland; Corresponding Secretary, Edith Crush, Daytona; Recording Secretary, J. R. Thomason, Lake City; Treasurer, B. B. Barnett, Leesburg.

WASHINGTON STATE DENTAL SOCIETY.

The Washington State Dental Society held its annual meeting at Seattle, May 27, 1904, and elected the following officers: President, R. S. Williams, Tacoma; 1st Vice-president, C. A. Custer, Seattle; 2d Vice-president, J. S. Balbridge, Sedro-Woolley; Secretary, J. W. Rawley, Tacoma; Treasurer, J. W. Downing, Spokane.

NEW HAMPSHIRE DENTAL SOCIETY.

At the recent annual meeting of the New Hampshire State Dental Society the following officers were elected: President, A. L. Parker, Penacook; Vice-president, W. A. Young, Concord; Secretary, F. F. Fisher, Manchester; Treasurer, G. A. Young, Concord; Librarian, E. W. Moore, Newport; Executive Committee, B. F. Staples, Portsmouth; J. H. Warthen, Concord; Q. P. Shaw, Claremont.

MINNESOTA STATE DENTAL ASSOCIATION.

The Minnesota State Dental Association held its annual meeting at St. Paul, June 17, 1904, and elected the following officers: President, L. O. Wells, Minneapolis; Vice-president, C. E. Parrott, St. Paul; Secretary, G. S. Todd, Lake City; Treasurer, H. N. Reid, Minneapolis; Chairman Executive Committee, J. F. McCrea, Minneapolis; Supervisor of Clinics, R. W. Berthal, St. Paul.

MASSACHUSETTS STATE DENTAL SOCIETY.

The annual meeting of the Massachusetts State Dental Society was held June 1, 1904, and the following officers were elected: President, Edgar O. Kinsman, Cambridge; 1st Vice-president, J. F. J. McLaughlin; 2d Vice-president, M. C. Smith, Lynn; Secretary, Chas. W. Rodgers, Dorchester; Treasurer, Joseph T. Paul, Boston; Librarian, T. W. Clements, Brookline; Editor, John W. Estabrooks, Boston.

SOUTHERN DENTAL SOCIETY OF NEW JERSEY.

The Southern Dental Society of New Jersey held its annual meeting at Atlantic City, June 9, 1904, and elected the following officers: President, A. Irwin; Vice-president, W. A. Jacquette; Treasurer, Mary A. Morris; Corresponding Secretary, C. Ironsides; Recording Secretary, S. Ironsides; Librarian, J. G. Halsey; Executive Committee, W. W. Crate, Chairman, C. E. Peck, J. G. Halsey, C. P. Tuttle, E. E. Bower, C. P. Tuttle, Jr.

INTERNATIONAL DENTAL CONGRESS BANQUET.

The Fourth International Dental Congress banquet will be held Sept. 1, 1904, at 8 p. m., in the Coliseum, adjoining the Congress Hall. The price per plate is $3.00. It is requested that all who expect to attend send their names and money to Dr. A. H. Fuller, P. O. Lockbox 604, St. Louis, at once, and in any event not later than Aug. 17. Arrangements to pay can be made with Dr. Fuller at the time of registration, provided notice is given before Aug. 17.

G. A. BOWMAN,
A. H. FULLER,
ADAM FLICKINGER, } Banquet Committee.

NATIONAL ASSOCIATION DENTAL FACULTIES.

The National Association of Dental Faculties held its annual meeting at Washington, D. C., June 8-11, 1904, and elected the following officers: President, S. W. Foster, Atlanta; Vice-president, M. W. Foster, Baltimore; Secretary, J. H. Kennerly, St. Louis; Treasurer, H. R. Jewett, Atlanta; Executive Committee, John I. Hart, New York; H. B. Tileston, Louisville; L. P. Bethel, Kent, O.; J. P. Gray, Nashville. Law Committee, F. D. Weisse, New York; W. P. Dickinson, Minneapolis; W. A. Montell, Baltimore. Foreign Relations Committee, E. C. Kirk, Philadelphia; Garrett Newkirk, Los Angeles; G. V. Black, Chicago; W. F. Litch, Philadelphia; G. V. I. Brown, Milwaukee. New Schools Committee, B. J. Cigrand, Chicago; A. O. Hunt, Omaha; D. R. Stubblefield, Nashville. Schools Committee, H. C. Miller, Portland, Ore.; A. J. Brown, Washington, D. C.

FEDERATION DENTAIRE INTERNATIONALE.

The fourth annual meeting will be held in the Coliseum building, St. Louis, August 26-27, 1904. The first session will convene under the presidency of Dr. Charles Godon, at 11 a. m. There will be a meeting of the executive council on Thursday, the 25th, at the Hotel Jefferson, at 10 a. m. The Section on Education will meet at 3 p. m. Friday. The Section on Hygiene and Public Dental Service will meet at 3 p. m. Friday. The Section on International Dental Press will meet at 4:30 p. m. Friday.

The officers of the sections are: *Education*—President, Dr. T. W. Brophy; vice-presidents, Dr. E. C. Kirk, Dr. W. B. Paterson and Dr. O. Zsigmondy; secretaries, Dr. M. Roy and Dr. R. B. Weiser. *Hygiene and Public Dental Service*—President, Dr. W. D. Miller; vice-presidents, Dr. Cunningham, Dr. Forberg, Dr. Jenkins and Dr. Rose; secretaries, Dr. P. Heide, Dr. Sauvez and Dr. R. B. Weiser. *Commission of the International Dental Press*—President, Dr. E. Forberg; vice-president, Dr. A. W. Harlan; secretary, Dr. E. Papot. *Executive Council*—President, Dr. Charles Godon; vice-presidents, Dr. A. W. Harlan, Dr. W. D. Miller; secretary, Dr. E. Sauvez; treasurer, Dr. F. Aguilar; members, Dr. George Cunningham, Dr. E. Forberg, Dr. R. B. Weiser, Dr. J. E. Grevers, Dr. F. Heide, Dr. Klingelhofer.

On behalf of the Federation.

A. W. HARLAN, Vice-President.
1122 Broadway, New York City.

NATIONAL ASSOCIATION OF DENTAL EXAMINERS.

This Association will hold its annual meeting in the Coliseum building, Thirteenth and Olive streets, St. Louis, August 25-27, 1904, beginning promptly at 10 a. m. Telephone and telegraph offices in the building. The committee on railroad accommodations for the East have made arrangements for fast through Pullman service to St. Louis from New York with the Delaware & Lackawanna Railroad. Two special Pullman cars will leave New York Tuesday, August 23, at 10 a. m. The cost of our excursion, including berth each way, will be $35.50. A proportionate reduction is made for those going from Buffalo, Toledo, Fort Wayne, and cities on the line connecting with the Wabash Railroad. Those who desire to go in the special train should send notice as promptly as possible to Charles A. Meeker, or to Guy Adams, division passenger agent of the Delaware & Lackawanna Railroad. Accommodations have been secured for the Association at the Franklin Hotel, corner of Sarah and Westminster place, with rates from $1.50 to $6 per day, European plan. Hotel first class. Secure rooms by writing to E. C. Dunnavant, St. Louis Service Company, Seventh and Olive streets, St. Louis.

CHARLES A. MEEKER, Secretary.

FOURTH INTERNATIONAL DENTAL CONGRESS.

August 29 to September 3, 1904.

The local committee and bureau of information wish to dispel from the minds of the profession and all persons any misconception that the rates of St. Louis hotels are extortionate. We have investigated the conditions and rates of the leading hotels of St. Louis, and notwithstanding the fact that this city is entertaining a World's Fair, the hotel rates are no higher than in other cities. We append a number of the leading hotels and rates of same, and call your attention to the fact that it is not required to put up at any of the hotels mentioned, as there are many hotels and boarding houses in the city where rooms can be secured for from 50 cents to $2 per day. The exact date should be stated in securing rooms.

Southern Hotel.—The American plan, rate is $5 per day for room without bath and $6 a day for a room with bath. The rate is $10 per day if two persons occupy the room.

Planters' Hotel.—Room without bath, occupied by one person, $3 to $4 a day. Same for two persons, $6 to $7 a day. Room with bath for one person, $4 to $5 a day, and for two persons, $7 to $8 a day.

Jefferson Hotel.—Room without bath, for one person, $4 a day; when occupied by two persons, $6 a day. Room with bath, for one person, $5 a day and up; when occupied by two or more persons, $7 a day and up.

St. Nicholas Hotel.—Room without bath, for one person, $2.50 to $3.50 a day; for two persons, $4 to $5 a day. Room with bath, for one person, $3 to $5 a day, for two persons, $5 to $7 a day.

Lindell Hotel.—Room without bath, for one person, $2 a day; for two persons, $3 a day. Room with bath, for one person, $3 a day; for two persons, $4 a day.

Washington Hotel.—Room without bath, for one, two, or three persons, $5 to $7 a day. Room with bath, for one, two, or three persons, $8 a day.

Laclede Hotel.—Room without bath, for one person, $1.50 to $2 a day; for two persons $3 a day. Room with bath, for one person, $3 a day; for two persons, $5 a day.

Terminal Hotel.—Room without bath, for one person, $2 to $3 a day; for two persons, $4 to $5 a day. Room with bath, for one person, $5 a day; for two persons, $7 a day.

Mosier Hotel.—$1 to $3 per day, European plan, with Silver Moon restaurant attached, very reasonable rates. Located at Ninth and Pine streets.

Hotel Rozier.—Opposite Exposition building, Olive and Thirteenth streets. Rooms without bath, $1 to $2 a day.

Mammoth Hotel Company.—Southeast corner Olive and Twelfth streets. Can accommodate 2,500 guests per day, at rates from 50 cents to $1.50 per day.

The Inside Inn.—With a capacity for 5,500 people, within the Exposition Grounds, erected under a contract with the Exposition management, stipulating its rates. This hotel offers 500 rooms at $1 per day, 500 at $1.50 a day, 500 at $2 a day, and the remainder, which are larger, with baths, at higher rates.

The Napoleon Bonaparte, the Forest City, the Fraternal, the University, the Kenilworth, the American, the Epworth, the Grand View, the States, the Oakland, the Iowa, the Guaranty, the West Park, the Christian Endeavor, the Visitors, and others, with a capacity for from 500 to 5,000 guests, are within easy walking distance of the World's Fair gates. In fact, we have hotels, boarding houses, apartment houses, and rooming houses, all over the city, of respectable character and on the street car lines.

An impression prevails that there may be lack of accommodations at reasonable prices. Not only will there be sufficient room for all who come, but the rates will be reasonable. We appeal to the profession of the country to give information respecting the accommodations in a spirit of fairness and justice to St. Louis based upon the above facts. St. Louis is prepared to care for and welcome all comers, and to show them the grandest Universal Exposition of the world's resources and products in the history of man.

The Fourth International Dental Congress is now an assured success. Many foreign nations have signified their intention to take part in it. The islands of the Pacific Ocean will be well represented. Their assembling in the center of this great republic should stimulate every American dentist to action, and each individual of this great profession should feel under obligations to help push the congress to a successful issue. We have our professional record to maintain and act the part of host. As a consequence we should endeavor to sustain the reputation of American hospitality. Here is the birthplace of the dental college, the most of the inventors, the mechanical geniuses, and the men who have brought about the wonderful advances in our great profession. We trust the profession of America will take hold with their accustomed vigor, let nothing be undone that will be for the good

of the profession, and carry it out with a most liberal spirit to a surprising conclusion.

A list of hotels, boarding houses, rooming houses and private homes, with their rates appended, will be furnished by the committee to all asking for same. Any other information will be freely given by corresponding with any of the following committee.

D. O. M. LeCron,
Chairman, Mo. Trust Bldg.
Max Fendler,
Secretary, Mo. Trust Bldg.
H. F. D'Oench,
Geo. H. Gibson,
S. H. Voyles,
Orme H. Manhard,
Joseph G. Pfaff,
G. S. Kitchen.

News Summary.

George H. Hurd, 75 years old, a dentist of Cleveland, died June 7, 1904.

E. R. Rust, 36 years old, a dentist of Denver, died June 2, 1904, of consumption.

S. J. Bartlett, 27 years old, a dentist at Poughkeepsie, N. Y., was drowned May 29, 1904.

All the World's a Stage and all the numerous doctors are merely ushers—both ways.

E. R. Austin, 28 years old, a dentist of Monticello, Ind., died June 2, 1904, from heart failure.

R. L. Stewart, 31 years old, a dentist of Newark, N. J., died May 9, 1904, after a short illness.

B. O. Harmon, 30 years old, a dentist of Hoosick Falls, N. Y., died May 31, 1904, of heart disease.

J. A. Marshall, 58 years old, a dentist of Belleville, N. Y., died June 2, 1904, after a short illness.

J. W. Van Sant, a dentist of Peoria, Ill., died suddenly May 22, 1904, from the bursting of a blood vessel.

Hemorrhage Nearly Fatal.—This month a woman at Hartford, Conn., almost bled to death after the extraction of a tooth.

Popular Motive Power.—Der most popular motive power of der day is der man dot chollies udder peoples along.—*Dinkelspiel.*

Dentist Secures Judgment.—A dentist in St. Paul has secured a judgment against a patient for $272 after bringing suit to compel payment of the bill.

SUNSHINE THOUGHTS.—By George H. Chance, D.D.S., Portland, Ore. A book of verse. The J. K. Gill Co., Portland, Publishers.

KEEP THE MOUTH CLOSED.—A man at Sioux City recently had his false teeth stolen from him while he was asleep. Another bad effect of sleeping with the mouth open.

CONSCIENTIOUS asks—Is it wrong to dam the teeth of a preacher? Not if it is done with discretion. The best way is either in a low breath or in the laboratory.—George E. Hunt, in *Summary.*

TO PREVENT BANDS FOR REGULATING APPLIANCES AND CLASPS FROM CHANGING SHAPE WHEN POLISHING.—Fill the bands with modeling composition, chill, and remove surplus with a sharp knife.—J. Q. BYRAM, *Review.*

FATALITY.—June 9, a woman died in a dentist's chair at Corry, Pa. She wanted a tooth extracted and insisted upon taking chloroform, although the dentist did not want to give it. She died immediately after it was administered.

DENTAL PARLOR RULED OUT.—May 26, a judge in Pennsylvania held that a certain incorporated dental parlor was not empowered by its charter or by law to practice dentistry in the state. Suit had been brought against the dental parlor by the state society.

DENTAL INFIRMARY FOR NEW HAVEN.—A dental clinic has been established at the free dispensary at New Haven, Conn., and prominent members of the dental profession in the city are giving their services free to the worthy poor. Dr. E. S. Gaylord is director.

EYESIGHT AFFECTED BY BROACH.—According to newspaper report, a young woman in Port Huron, Mich., had been gradually losing her eyesight, and on investigation it was found that the broken end of a broach had been left in one of her teeth, which had afterward been filled. On removal of the piece the eyesight gradually returned.

FALLACY OF CONDENSING GOLD ON GUTTA-PERCHA.—It is almost impossible to conceive of one being able to condense a metal upon an elastic substance such as gutta-percha. I would certainly wish seriously to put in my protest against the condensation of gold over an elastic gum. I do not believe any man with a good appreciation of physics could indorse that method.—C. L. HUNGERFORD, *Era.*

TO GET BETWEEN THE TEETH.—Whether for examination or cleansing purposes, waxed silk, fine linen thread, or rubber bands may be made to pass between the teeth readily by first soaping them. Cotton tape or twine is easily made to go to place for wedging purposes by first subjecting it to the same treatment. The soap soon disappears and the cotton swells as of old.—*Dent. Off. and Lab.*

ETHER ANESTHESIA.—In giving ether it is a mistake, after anesthesia is complete, to continue it until a profound effect is produced and then to leave it off until the patient shows signs of returning to consciousness. Allowing the patient one breath of pure air to every four or five of ether will commonly keep him in excellent condition, while the anesthesia is effective and safe.—*Inter. Jour. of Surg.*

ABORTIVE TREATMENT OF BOILS.—Gallois (*Therapie der Gegenwart*) advises for this purpose that the boil should be painted with a concentrated solution of iodin in acetone. This solvent takes up four times as much iodin as alcohol, and its use on a boil is followed by the formation of a brown scab, under which the inflammation subsides. The solution should be kept for some weeks before it is used.

REMOVAL OF FOREIGN BODIES FROM THE ESOPHAGUS.—For the removal of fishbones, pins, needles, etc., from the upper part of the esophagus, if a bristle probang is not at hand, make a little ball of absorbent cotton, lubricate it with a little butter after it has been tied to a string, and cause the patient to swallow it. By pulling it out again with the string the foreign body can often be removed.—*Inter. Jour. Surg.*

DIVORCES.—Henry M. Baird, a dentist of Davenport, Ia., was recently granted a divorce from his wife.—Julia Keats has been granted a divorce from her husband, Albert H. Keats, a dentist of Chicago.—Rose Muser has brought suit for divorce against her husband, Louis J. Muser, a dentist of Chicago.—Bessie G. Morrow has applied for divorce from her husband, George E. Morrow, a dentist of Baltimore.

PAIN FOLLOWING THE EXTRACTION OF TEETH.—Fill the alveolus with a cotton tampon saturated in a solution composed of equal parts of chloral hydrate, glacial phosphoric acid, and glycerin, and the pain will disappear. The chloral hydrate and the glycerin attenuate considerably the caustic effect of the glacial phosphoric acid. This dressing, besides the pain-relieving properties it possesses, is a powerful antiseptic.—*Rev. de Dent. Appliquée-Cosmos.*

QUICK SEPARATION CONTRAINDICATED IN TEETH TO BE FILLED WITH AMALGAM.—When amalgam is used quick wedging is contraindicated in any but small fillings. Unless the teeth are kept apart sufficiently long to overcome the tendency to immediately resume their normal position, any contouring will be destroyed; possibly, indeed, the filling may be broken up and disintegrated by the teeth springing together as soon as the wedge is removed.—D. LINLEY PALMER, *Brief.*

SILLY.—Ella, a miss of ten, had just undergone her first dental experience, filled of course with apprehensions diligently instilled and cultivated by witless friends, but to her disappointment and their chagrin it proved utterly painless.

"And is *that* all there is of it?"

"Yes."

"How silly!"—*Dent. Off. and Lab.*

MODERN DENTAL OUTFIT DANGEROUS.—Dr. J. F. Wagner of Seattle, Wash., writing in the *Gazette*, states that on several occasions his patients received a severe electric shock while he was inserting metal fillings. On investigation he found that when his foot touched the rheostat or controller of his electric engine, with the patient's feet resting on the metal footpiece of the chair, the fountain cuspidor running, the patient received an electric shock. An electrician of his acquaintance warned him that if conditions should be just right the patient might be seriously injured.

POISONING WITH THE POWERFUL ANTISEPTICS.—Remember that mercury bichlorid, carbolic acid, and iodoform may cause systemic poisoning, even in the small amounts commonly employed for dressings. The sublimate gives rise to diarrhea, with pain and a rising temperature; carbolic-acid poisoning is attended by the well-known changes in the urine, sometimes with severe vomiting, lowered temperature, and collapse; while iodoform may cause collapse or a rise of temperature, with a feeble pulse, and delirium and drowsiness, particularly in children.—*Intern. Jour. Surg.*

PRACTICE OF DENTISTRY BY PHYSICIAN IN MASSACHUSETTS.—Chapter 219 of the Acts of Massachusetts of 1903, entitled "An act relative to the practice of dentistry," amends Section 29 of Chapter 76 of the revised laws so that it reads: The provisions of Sections 24 to 28, inclusive, shall not apply to a physician registered under the provisions of this chapter "and in actual practice as a physician, in cases where he deems immediate treatment necessary for the relief of his patients," etc., the amendment consisting of the insertion of the words inclosed in quotation marks.—*Jour. Am. Med. Ass.*

FIRES.—Long & Clark, Forest City, Ark., June 12, loss $1,700, no insurance. —May 25, every dentist in Yazoo City, Miss., was burned out, and the losses were about as follows: A. B. Kelly, $1,000, insurance $625. N. L. Swaye, $600, insurance $400. T. D. Hull, $700, small insurance. O. B. Hilzin, $300, insurance $200. W. T. Martin, $4,000, insurance $1,500.—R. T. Tillotson, Lyons, N. Y., June 16, loss $25.—J. M. Spanogle, Altoona, Pa., May 28, loss $100, covered by insurance.—Albany Dental Parlors, Providence, R. I., June 2, loss $300.—B. M. Cortham, Spooner, Wis., June 13, loss $500, small insurance.

WARNING.

Go 'way Mistuh Skeeter! Don't you sing dat song to me!
I's huyhd about yoh doin's; you's es tough as you kin be.
You's been aroun' a-lunchin' on malaria an' things
Till you's jes' about as danj'us as a rattlesnake wif wings.
I didn't use to min' you when you come a-browsin' 'roun',
Ca'se I knowed a slap 'ud send you tumblin' senseless to de ground.
But since I huyhd dem white folks I's as skaht as I can be.
Go 'way, Mistuh Skeeter! Don't you sing dat song to me.

—*Washington Star.*

PREVENTION OF SNORING.—Konrad Kuster (*Deutsche med. Woch'ft*) found that with the exception of certain diseases, such as hypertrophies and adenoids, etc., which obstruct nasal breathing, snoring is only a habit which may easily be overcome. Snoring is due to the patency of the mouth during sleep, and stops as soon as the mouth is closed. The condition is aggravated when the patient lies on his back. The author constructed a bandage to hold up the lower jaw and to prevent its dropping during sleep. These bandages may be used on children who habitually sleep with their mouths open—a habit which produces catarrhal conditions, deafness, etc. The bandage should be applied every night until the child has become used to nasal breathing.

DOCTOR AND BABYLONIAN LAW.—In the writings of Hammurabi, of Babylon, 2,250 B. C., the following interesting laws are found: "If a physician operates on a man for a severe wound with a bronze lancet and saves the man's life, or if he opens an abscess (in the eye) of a man with a bronze lancet and saves that man's eye, he shall receive ten shekels of silver (as his fee). . . . If a physician operates on a man for a severe wound with a bronze lancet and causes the man's death, or opens an abscess (in the eye) of a man with a bronze lancet and destroys the man's eye, they shall cut off his fingers."

SALIVA AS A FACTOR IN THE CURE OF DISEASE.—Bergmann (*Therapie der Gegenwart*) styles the gargle therapeutic trifling and inefficient for any real purpose. He thinks, on the other hand, that saliva reaches every part of the throat and can be made a vehicle for therapeutic application. To increase the flow of saliva he has chewing tablets and advocates their use in dyspepsia, obesity and edema. He has a special medicated and non-medicated tablet for each form. The alkaline saliva is especially beneficial in acid dyspepsia. In obesity and edema the accumulating saliva is expelled in large amounts and the results are surprisingly favorable.

ROBBERIES.—June 16, thieves robbed several dental offices in South McAlester, I. T.—Lyman & Lyman, Topeka, Kan., June 17, $300.—J. H. Solecki, Topeka, Kan., June 17, $100.—R. T. Souders, Topeka, Kan., June 17, $35.—G. B. Wortman, Massillon, O., June 6, $35.—K. J. Donohue, Cleveland, May 31, $20.—L. H. McDonald, Norwalk, O., June 12, $10.—C. N. Bradford, Cincinnati, May 22, $75.—J. R. Johnston, Cincinnati, May 22, $80.—C. W. Niedhamer, Cincinnati, May 22, $90.—C. W. Thomas, Rochester, Pa., May 19, $20.—P. H. Brown, El Paso, Tex., June 11, $200.—June 14, several dental offices in San Antonio, Tex., were robbed.

EXAMINING BOARD AFFAIRS.—At the May meeting of the Arkansas Board 11 out of 16 applicants were successful in passing their examinations.—At the May meeting of the California Board 69 out of 84 applicants passed the examination successfully.—June 18, the Governor appointed Dr. E. D. Rose of Bowling Green a member of the Kentucky Board.—At the May meeting of the Missouri Board 14 out of 18 applicants were successful.—At the June meeting of the Montana Board 10 out of 12 applicants passed the examination successfully. Dr. George W. Pelzer of Great Falls was elected President, and Dr. D. J. Waite of Helena, Secretary.—At the May meeting of the Washington Board 18 out of 35 applicants were successful in passing the examination.

HYPERSENSITIVE PATIENTS.—Most patients in the dental chair are more sensitive to the slightest sound, or touch producing sound, than the most timid woman alone in a house. A quick mind, a wide knowledge, and a quick sympathy for their mental condition can so occupy their minds as to divert the attention and center it upon other things until those sensations fall below consciousness. To do this requires energy and vitality, and it must be remembered that the more severe the sensations the more firmly must the attention be held. The operator must, then, not only do the work, but he

must literally shoulder the mental condition of the patient. While he must study the reason for every motion of his fingers and instrument, he must observe the patient as closely.—F. B. NOYES, *Northwestern.*

EVERYTHING SPECIALIZED.—At a meeting of physicians one speaker was cynically deprecating the ultra-specialism of the age in medicine and surgery. Said he: "This rage for parceling out the human frame into special territories is passing all bounds. As it is, we have specialists for the nose, the throat, the ear, the lungs, the heart, the genito-urinary organs, the rectum, the mouth, the brain, etc. It seems to me, gentlemen, that it will not be long ere the specialist, like Alexander, will have to sigh for new regions to overcome. So far as I can see, the umbilicus is about the only portion of the human body not allotted to a specialist." Whereupon a grizzled, veteran practitioner, raising his hand, exclaimed: "Doctor, you're forgetting the naval hospitals."

PLATINUM FOIL IN THE LABORATORY.—(1) In those cases where it is necessary to make the addition of a tooth to a metal plate the foil does away with the necessity of swaging a small piece of plate. (2) For repairing cracks in a metal plate it is again invaluable. (3) In putting a new tooth on to an old backing, especially in those cases where the holes for the pins of the tooth have been made too large or too far apart. (4) Used for the purpose of backing shallow saddleback bicuspids and molars to be used in close bite for plate work. (5) Used for the purpose of making a porcelain-faced crown. After the metal crown is swaged, cut out a piece with a fret-saw and fit a tooth backed with platinum foil into position; it can then be soldered from underneath, making a cement-tight crown.—D. E. CAUSH, *Brit. Dent. Jour.*

EDITOR AND DOCTOR.—If an editor makes a mistake he has to apologize for it, but if a doctor makes one he buries it. If the editor makes one there is a lawsuit, swearing and the smell of sulphur, but if the doctor makes one there is a funeral, cut flowers and a smell of varnish. The doctor can use a word a yard long without knowing what it means, but if the editor uses it he has to spell it. If the doctor goes to see another man's wife he charges for the visit, but if the editor goes to see another man's wife he gets a charge of buckshot. When a doctor gets drunk it's a case of "overcome by heat," and if he dies it is heart trouble. When an editor gets drunk it's a case of too much booze, and if he dies it's a case of delirium tremens. Any old medical college can make a doctor. You can't make an editor. He has to be born.—*Factotum.*

TAKE MODELS OF THE MOUTH FOR DIAGNOSTIC PURPOSES.—When approaching a case for treatment, and an examination of the mouth reveals a weird variety of roots and teeth, it is not advisable to decide and commit oneself too hurriedly upon the treatment to be followed, as if it may transpire upon closer investigation that some different treatment from that which first suggests itself is necessary. To make a change often means delay and loss of time, and it looks like indecision and is liable to disturb the confidence of the patient. I lay great stress, therefore, on obtaining models of the mouth

before anything is done, taking time to consider them carefully before making any specific statement as to the treatment advocated. The models will show which teeth it is best to preserve in view of supporting the denture or bridge or for giving the best articulation.—ALEX. A. MATTHEWS, *Brit. Dent. Jour.*

ILLEGAL PRACTITIONERS.—June 7, a dentist at Bradford, N. Y., was fined $150 for practising dentistry without a license. This was his second offense. —June 11, a dentist of Brooklyn was arrested for practising dentistry without displaying his certificate or license.—A man at Newport, N. H., was recently arrested for practising dentistry without a certificate. He threatens to carry the matter to the superior court.—June 16, a man was arrested at New Madison, O., for practising dentistry without a state certificate.—June 13, a jury at Columbus, O., found a man guilty of practising dentistry without a certificate.—May 24, five men were arrested in Spokane, Wash., for practising dentistry without a license.—May 13, three men in Spokane were each fined $100 and costs for practising dentistry without a license, and another man was fined $200 and costs.—June 15, a man was arrested in Milwaukee for practising dentistry without a license.

DAMAGE SUITS.—Last month a dentist in Los Angeles was sued for damages for alleged malpractice by the mother of a boy. When the case came to trial this month the judge decided in favor of the dentist.—A man in Philadelphia has sued a dentist for $5,000 damages, claiming that he called on the dentist to have his teeth cleaned, and that the latter cut off some sound teeth without his consent. The dentist alleges blackmail.—A man in Pittsburg has sued a dental parlor to recover the money he paid for two crowns. He alleges that, although they were guaranteed, they soon became loose and fell out.—A woman in Newark has sued a dentist for $300 damages, alleging that he cut her tongue while extracting a tooth, and that blood-poisoning set in.—A woman in Park City, Utah, some time ago sued a dentist for $5,000 damages, alleging that he extracted a sound third molar. The case was bitterly contested and on June 3 was decided in favor of the dentist.

FOREIGN BODIES IN THE FRONTAL AND MAXILLARY SINUSES.—Haenisch (*Jour. of Eye, Ear and Throat Diseases*) has collected the pubished cases of foreign bodies in the frontal and maxillary sinuses. In eighty cases the maxillary and in thirty-six cases the frontal sinus was invaded. The bodies entered (1) through the natural orifices; (2) in the maxillary sinus through an aperture in a diseased tooth or through the opening left after removal of a tooth; (3) through the walls of the sinus. In the case of the maxillary sinus seven of the foreign bodies had entered through the maxillary foramen, thirty-five through the alveolus, twenty-eight through the walls, seven developed in the cavity, while in three the path was unknown. In the case of the frontal sinus, twenty-five of the bodies entered through the natural orifice, eleven through the wall. In nearly half the cases the average duration was one to five years. In two of the antral cases there was a history of forty-two years. Living insects in healthy sinuses caused the severest results. Small bodies were more troublesome than large ones, owing to their mobility.

HYDRONAPHTHOL IN DENTAL THERAPEUTICS.—Hydronaphthol is too well known to need any description now. Its first and greatest claim is that it is a powerful antiseptic and yet is non-toxic and non-irritant, and—what to us as dentists is very important—the odor is not disagreeable. For convenience in using I keep hydronaphthol mixed with cement powder in the different proportions I generally use. I mix by weight, using one part hydronaphthol to five of powder, also one part to ten, one to twenty, one to fifty, and one to one hundred. With these different proportions prepared and put in bottles, I can use them as readily as the plain cement powder. In a cavity so deep that I know I am unable to remove all infected dentin, I use the proportion one to one, or one to five, to be covered with one to one hundred, or with clear cement or amalgam. If I want to put a non-conductor under gold I use one to twenty; under an inlay in a deep cavity I use one to twenty or thirty; for filling a pulp chamber, one to twenty; for setting an inlay, one to one hundred.—E. A. ROYCE, *Review.*

IMMUNITY OF THE TISSUES OF THE DENTAL CAVITY TO AUTOINFECTION.—Dr. R. H. M. Dawbarn stated as his opinion that the explanation of the well-known immunity of the tissues of the oral cavity to autoinfection lies in the fact that from birth until death the region under discussion is vaccinated, so to speak, with ptomains and toxins, the products of the life activities and death decompositions of the germs normal and native to that region; and that because of such vaccinations, the outcome of the numerous slight lesions so frequently occurring, the flesh thereabouts is in some way made better able to combat and overcome any ill results when greater wounds are received. Then, too, it is a fact worth noting that each healthy individual's saliva is not dangerous to himself, even elsewhere than the mouth, wounds, or fractures, though this secretion would be perilous to another individual. Probably the reason for this is the one already mentioned—a continual vaccination. We have all seen wounds upon the hands of street urchins sucked and washed clean by their spittle, just as a dog cleanses himself, with no ill result.

BOILING POINTS OF METAL.—By the use of vessels of quartz heated by an electric furnace Krafft has determined the boiling point of certain metals, as follows: Zinc sublimes below 300 degrees, and at 640 degrees distills fairly quickly; the corresponding temperatures for cadmium are 322 degrees and 448 degrees. Selenium distills quickly at 380 degrees; tellurium at 550 degrees, boiling being observable at 535 degrees. Lead boils rapidly and distills at 1,160 degrees. Tin proved very refractory, no distillation occurring even at 1,100 degrees. At 605 degrees antimony sublimes slowly, and at 775 degrees to 780 degrees rapidly. Sublimation of bismuth commenced at 540 degrees, the sublimate assumed the form of drops at 930 degrees, and the metal boiled briskly at 1,050 degrees. A slight mirror of silver appeared at 1,090 degrees, and rapid vaporization proceeded at 1,340 degrees. Copper and gold boil at too high temperatures to be examined, even in silica; with the former a slight amount of sublimate formed at 1,315 degrees, and with the latter extremely little vapor arose even at 1,375 degrees, which is near the point at which the resistance of silica breaks down.—*Pacific Med. Jour.*

"India-Rubber Jaw."—W. B. Cleland, in the *British Medical Journal*, reports the case of a man, aged fifty-five, suffering from a peculiar carcinomatous invasion of the lower jaw from the submaxillary salivary gland. The jaw-bone seemed broken at the symphisis, and the two halves could be readily moved on each other. The jaw was removed under chloroform, and one year later there was no sign of recurrence. The horizontal ramus of the removed jaw was found to be swollen into a pear shape on cross-section. Macroscopically no bony tissue remained, the original structure being replaced by a dense whitish neoplasm easily cut by a knife and yielding a creaking sensation. The teeth were quite perfect and embedded in this new tissue. The microscope showed narrow epithelial-lined ducts branching between fat cells and terminating in rounded alveolar ends. The muscle tissue seemed to escape invasion. The condition is a rare one, and the case was remarkable for the general good health of the patient, the peculiar characteristic of elasticity on the part of the jaw affected (india-rubber jaw), and the absence of practically all degenerative processes even where the cells were aggregated into considerable masses.

Inserting Cotton Dressings in Root-Canals.—The rolling of cotton upon the broach is done by first laying a few loose fibers upon the forefinger of the left hand. The broach is placed upon it, allowing a few fibers to lie beyond its end. Next, the thumb is lightly pressed upon the broach. The shank is then quickly rotated with the right thumb and forefinger, and as the cotton is rolled up the left thumb and forefinger are used to stroke it into a symmetrical cone. If the pointed broach be used it will be noted that there is a tendency on its part to penetrate the end of the cone of cotton. This may be obviated by slightly truncating the end of the broach with scissors. This penetration of the cotton is annoying from the fact that apical tissues are liable to be irritated, and that the broach is liable to be stripped of the cotton, which crowds back upon it as it comes into friction with the canal walls. In use as a dressing carrier, the broach is constantly twisted to the right, if twisted at all. To remove cottons it may be twisted in this manner into the loose fibers until these are tightly engaged, but as a rule an old barbed broach or cleanser is preferable for this purpose. Anyone who has used as a cotton-carrier a broach which requires a wire brush or burning off to free it will be much relieved by the adoption of this method.—Otto E. Inglis, *Stomatologist.*

Marriages.—Walter Cain, a dentist of Idaho Springs, Ida., was married to Miss Alice Casey of Beloit, Kan., June 4.—J. L. Carithers, a dentist of Cincinnati, was married to Miss Annie Dupper of Cincinnati, June 15.—C. D. Carley, a dentist of Cincinnati, was married to Miss Ruby A. Connell of Cincinnati, Feb. 18.—C. H. Davis, a dentist of Albion, N. Y., was married to Miss Mabel Wilcox of Albion, June 1.—C. C. Dobbs, a dentist of Minneapolis, was married to Miss Alice B. Ervin of Minneapolis, June 8.—Wm. Gammans, a dentist of Alameda, Cal., was married to Miss Helen Chase of Bangor, Me., June 8.—V. E. Herbert, a dentist of Alta, Ia., was married to Miss Emma Rawn of Alta, June 8.—A. R. Kempter, a dentist of La Crosse, Wis., was married to Miss Margaret Mailer of Winona, Minn.,

June 9.—J. F. Meyer, a dentist of New Albany, Ind., was married to Miss Bertha M. Fiscus of Indianapolis, May 25.—J. E. O'Grady, a dentist of Marshalltown, Ia., was married to Miss Clara Sayre of Kensett, Ia., June 16.—Marion Randall, a dentist of Brooklyn, was married to Samuel Brock of Brooklyn, May 18.—H. G. Stalnaker, a dentist of Logansport, Ind., was married to Miss Josephine Ruhl of Logansport, May 30.—T. J. Todd, a dentist of Sedalia, Mo., was married to Miss Minta G. Mauzy of Kansas City, June 8.—George Wing, a dentist of Ferndale, Cal., was married to Miss Elizabeth Schoff of Columbus, O., May 26.—W. H. Weybright, a dentist of Huntington, Ind., was married to Miss Mora Keys of Winamac, June 21.

From All Over the Country.—The Digest is splendid and improving with age. J. D. Moody, Los Angeles.—I can't get along without the Digest. M. Olive Read, Lake Forest, Ill.—The Digest is ever welcome. R. W. Hutchinson, New York.—I consider the Digest among the best of the journals that come to my table. W. N. Rowell, Lewisville, Tex.—I don't want to be without one number of the Digest. Jesse Chilton, Fullerton, Cal.—I like the Digest. V. K. Chandler, Delavan, Ill.—The Digest is the best professional and ethical stimulus I know of. Otto Plutschow, Chicago.—The Digest is the best journal now afloat. H. W. Hemingway, Iowa Falls, Ia.—The Digest is a "cracker." J. Enos Wait, Superior, Neb.—I like the Digest very much. E. H. White, Lewiston, Me.—The Digest is all right and I enjoy reading it very much. H. A. Freeman, Evanston, Ill.—I take great pleasure in reading the Digest and find it very interesting. B. E. Amyot, Cohoes, N. Y.—The Digest has become indispensable to me. You certainly deserve a great deal of praise for getting out such a creditable publication. W. T. Born, Kenton, O.—I take several dental journals, but regard the Digest as the best of them all, and always welcome its coming. O. M. Nisley, West Lafayette, Ind.—I find the Digest very helpful. F. G. Conklin, Chicago.—I send one dollar for the best dental journal published, the Digest. It is the best dollar I spend every year, and if all my other dollars would yield the same ratio of returns I would have to hire a safety vault in which to put my storehouse of knowledge. E. M. Kettig, Louisville.

Cheap Ride.—This story was told at a recent meeting of a medical society in this city: A physician practicing in one of the smaller cities up the state was aroused at midnight by an inebriated individual who insisted that the man of medicine accompany him immediately to his home, three miles back in the country.

"Ser'us case, doc," said the caller, "Mush come 'medjtly."

The physician protested that his man was absent and there was no one on the premises who was able to hitch up the horse.

"'Sall right," said the insistent one. "I'll hich 'm in shiffy. Show-meem."

"You understand, of course," warned the doctor, "that while my charge for a call in that district is one dollar in the daytime, I'll have to charge you two dollars for going out there at this time of the night."

For answer the caller placed a two-dollar bill in the doctor's hand.

They went out to the barn, the stranger hooked the horse up in no time

at all, and they set out for the back country at a good pace. Arrived there, Sawbones asked to see the patient. The inebriated one tumbled out of the buggy and leered at the other as he said:

"I'm ze only patien'. Tell yer how 'tis, doc. I went zer livery stable, see! Asked liv'ryman how musheed sharge take me home. He sez four dollars, 'n I sez's outrache. Sez I kin git home for two dollars, 'e sez 'e'll bet ten I can't. Mush 'bliged t' you, doc, f' puttin' me two dollars ahead o' the game."

What the physician said was not reported for publication.

ATROPHY OF THE BONES OF MASTICATION.—Dr. Fritz Neumann (*Odontol. Blatter*) gives results of his investigations. Atrophy, he states, is a normal vital process. We have active atrophy, passive atrophy (neuropathic—by means of pressure), senile atrophy. Atrophy of process in early life. Man, thirty-three years old, had scurvy at age of sixteen, a mild case affecting the buccal mucous membrane only. No trouble after this until thirteen years passed and teeth became so loose that they could be removed with the fingers, and but one tooth, the cuspid, remaining firmly in the maxilla. The gums were not as might be expected after time elapsed since extraction—firm and dense, but soft and spongy. A plate was made, at first satisfactory but loose after four months; this was remade five times within two years, each fresh plaster impression proving that the bony arch had become smaller and the plate too large. This atrophy no doubt affected only the alveolar projections, an atrophy which proceeded for three years and then ceased entirely, as a plate is now worn with entire satisfaction and the cuspid tooth remains quite firm. Senile atrophy is the best type of complete atrophy; it not only affects the process, but physiologically produces or is accompanied by changes in the form of the entire bone, as witnessed by alteration in contour of mandible which comes with old age. We have partial atrophy after every extraction. It can also occur as a result of diseases of periosteum and gums, alveolar pyorrhea, mercurial and ulcerous stomatitis, lupus, tuberculosis, arthritis, particularly arthritis urica; is also said to follow morphinism, and is observed in cases where perforations have occurred through the outer walls of the cheek, even exposing the antrum of Highmore. Diseases of the female genital organs, disturbed menstruation, climatic changes, and diseases of digestive organs may produce loss of teeth and consequent atrophy. Complete atrophy can be brought about by loss of teeth, consequent to syphilis, diabetes mellitus, scurvy, tabes dorsalis.

A peculiarity of senile atrophy is that front or side (back) teeth loosen first, never both at once, cuspids being exceptions probably on account of long deep root. In the mandible the anterior teeth always loosen last. This is not to be explained, but the difference in loosening of the upper teeth is more easily understood when the embryonic origin of maxilla is considered. The intermaxillary bone atrophies separately and independently of the sides; this also explains why the anterior portion of the maxilla disappears so markedly that the mandible appears to project outside and beyond the former normal arch line; the intermaxillary bone has atrophied first.